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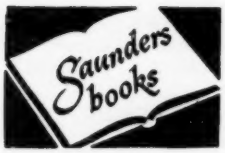


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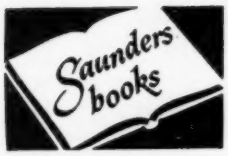


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# THE PRINCIPLES AND PRACTICE OF HOME CARE

*E. M. Bluestone, M.D., New York*

The elementary principles of home care have been applied since the dawn of time and have expressed themselves from first to last in a variety of forms, unorganized and organized, primitive and modern, indiscriminately and discriminately. The hospital, or institutional, method of caring for the sick was a much later phenomenon in the history of medical care. It came into existence for the purpose of transferring the patient out of his home, because, for one compelling reason or another, this seemed to be desirable. A burden was thus lifted from the shoulders of the family under a policy of service that set the home and the hospital apart. There was no sharing of the responsibility; it was either one or the other. Under pressures of many kinds the hospital has taken liberties with its terms of reference. It has, in fact, exhibited a high degree of selectivity and exclusiveness as it shut itself up within its walls. The home and the hospital, like all other human institutions, have, however, been changing, with the result that each of them is beginning to respond to the new requirements of medical care. The hospital is emerging from its shell to serve as a clinical center surrounded by concentric circles of medical activity. Since we are entering a new era of medical care and returning to the possibilities of the home in relation to the hospital under far more favorable internal and external circumstances than ever before, we ought to reexamine the hospital position and take full advantage of our opportunities.

The modern dwelling is not, as a universal rule, a place to escape from during illness—even infectious illness—as it was, almost always, in earlier days. The new specialty of environmental medicine, which declines to separate a sick man from his environment, has entered our homes and our hospitals, and it will continue to exert a wholesome influence as the servant of both under all circumstances. We are now in a better position than ever to reconsider the relative contribution of the hospital to medical care as compared with the home and the relation of the two in the presence of illness of whatever nature.

Home care, as a permanent, organized, extramural function, based on the comparative claims of patients on both sides of the walls of the hospital to its facilities, is a very recent development, dating from the beginning of the successful project in Montefiore Hospital, New York City, in January, 1947. Restricted only by absorptive capacity, it has placed at the disposal of the modern general hospital, with a minimum of expense and a maximum of individualization, an additional number of beds under merged responsibility for all-round redistribution according to need. Many experiences of a limited nature over a long period of time, most of them lacking in the essentials of experimental investigation, have made their contribution to the formulation of this parent home care program. The principles of home care will not, however, be fully translated into actual practice as long as the family physician is excluded from its benefits or, to state the case another way, as long as this service is the exclusive property of the closed medical staff of the hospital. This is not to say that every hospital must admit every practitioner of medicine to active duty within its walls regardless of his qualifications for high grade intramural service. Home care is, in fact, a productive means of collaboration that draws on all elements of medical society for helpful service in a sphere of activity that belongs to the rank and file of physicians who engage in the private practice of medicine. As matters still stand, the relationship between the intramural hospital staff and the unattached physician is far from satisfactory. It is chilly on one side and distrustful on the other, yet there is nothing mutually exclusive about them. Home care should, indeed, provide the proof of medical consanguinity. This is another reason why it should be the next step in the development of a sound communal medical care program.

There are now some 30-odd, more or less complete home care programs in the United States, with many more under consideration, apart from those that belong to the classification of sporadic home visits to the indigent, as public charges on government departments of welfare or miscellaneous philanthropic agencies, during emergencies. The more formal of these programs that have come into existence during the last few years are the direct descendants of the original integrated program that I planned and inaugurated in New York, and their influence on medical care is growing and expanding. Some of them have adopted modifications of the original

Consultant, Montefiore Hospital.
Read before the third International Gerontological Congress in London, England, July 20, 1954.

program because of financial restraints or for other reasons of expediency. A few have given their allegiance to other than hospital auspices, reverting to the archaic method by which the immediate need is satisfied as an act of charity in response to an irresistible plea for help. According to the apologists for these plans, the responsibility for a home care program may be transferred in those instances in which the general hospital has been tried and found wanting or in which the hospital is devoted to a curative activity that deals only with the relief of urgent physical signs and symptoms of disease (the general hospital that insists on perpetuating its rigorous "acute" label). Among other things, such programs, in their spotty incompleteness, miss many of the "fringe benefits" that only a modern general hospital can give. It is a lukewarm approach to the problem.

How, then, shall we test each home care program and measure its value for the patient as well as for medical progress? The questionnaire, which requires solid practical answers rather than the expression of pious intentions, looks somewhat as follows, and I submit it as a guide to our efforts in this area of medical care.

### MOTIVATION IN HOME CARE PROGRAM

What were the motives for the organization of the home care service under review, and has the response been sustained? As this program evolved in my own mind it leaned heavily on (*a*) the rebellion against ward care brought about by the cold, impersonal, mechanical service doled out over a strictly limited period of time and (*b*) the consequent need for discovering a way to give a sense of personal importance to each patient. Home care does, indeed, justify the feeling that the hospital exists for his special benefit. The need for individualization does not seem to move those who are in authority as much as the promise of financial economies or the certainty of vacating needed hospital beds.

When the destiny of the patient is governed by financial economies or by the need for conserving intramural hospital beds, the extramural service as compared to the intramural service runs the risk of incompleteness, mediocrity, and neglect. The motivation that emanates from the needs of the individual patient within an integrated program is the best guide for the planner as it is the best test of usefulness.

### ADMINISTRATION AND ORGANIZATION

1. What are the auspices of the home care program and where does administrative and clinical jurisdiction lie? Is it extramural in relation to the hospital, sharing with the intramural patient all of its high-grade facilities (ambulatory staff plus portable equipment)? Is it the result of a policy of complete, comprehensive, and continuous medical care even though the clinical circumstances are less pressing or the patient uncomplaining? Or does it stand, detached and decentralized, as a casual phase of medical activity?

Is it under the jurisdiction of the local department of health, or the local department of welfare, or the local visiting nurse service, or any other health organization that must, on final analysis, act as middleman and appeal to the general hospital for help whenever necessary?

If it is true—and this should be beyond question—that the modern general hospital provides the best medical facilities in any community, why should we accept a substitute for the best, or make the best more difficult to attain by the intermediation of other agencies that, in their extremity, "hold the bag" after the hospital has discharged the patient, along with its obligation, into the street?

2. Does the home care program share all of the highly specialized equipment of the hospital, with the only exception of those facilities to which the patient must be brought because they cannot be brought to him? Is this department organized, administered, supervised, and controlled by the intramural clinical and administrative authorities of the hospital under an integrated policy, subject to adjustment for distance and location? (In the original program an exception in this respect was made for the nursing department, because there seemed to be no special advantage in stripping the hospital wards of nurses during a period of nursing shortage when the excellent facilities of the Visiting Nurse Service were immediately available).

Does the patient under home care enjoy the same rights as the intramural hospital patient when the necessity for laboratory work, consultation service, and other special service arises?

3. Is there a free interchange of patients on a priority basis between the hospital and the home during periods of changed requirements?

4. Where does responsibility lie for the proper conduct of the home care program? Is it an administrative department within the hospital, preferably under a division of social medicine, or is it treated as an independent activity apart from all other related activities within the hospital?

5. Are the medical records, financial records, social statistics, and vital statistics of home care adequate and immediately available to the authorities of the hospital and to the qualified student of medical care?

6. Is the home care program in a position to absorb eligibles from the list of patients waiting for admission to the hospital, either directly or by collaboration with the practitioner?

7. How firm is the union between intramural and extramural hospital activities from the standpoint of power, authority, discipline, and the like? In other words, is the home care program part and parcel of the hospital, or does it have a haphazard existence, resulting from the comparative mildness of the medical pressures it is able to exert?

8. Is the home care patient represented at the administrative, therapeutic, and clinical conferences of the hospital? Are the failures that may affect him the subject of discussion that one expects to hear when they affect the intramural patient? Is the hospital as eager, with equal resources, to prevent as well as to cure and rehabilitate? And, where it fails, is it as ready to make every effort to explain its failures without regard to the location of the patient? Do the "minimum standards" of accrediting agencies apply with equal force on both sides of the hospital wall?

9. Are the lines of organization and administration of the home care program under review simple or complex? Do they deal with one hospital, or are they lost among a multiplicity of hospitals?

COMPARISON OF HOSPITAL AND HOME CARE FACILITIES

1. Has the home care patient had the benefit of a working diagnosis, based on a period of hospitalization sufficient to provide this information, as a subsequent guide to treatment? When this is not immediately necessary, is the hospital prepared to admit the patient at any time if such a course should prove to be desirable?

2. Is the clinical record of the patient continuous, and does it present a logical sequence of clinical entries from beginning to end?

3. Does medical continuity keep pace with social continuity as between intramural and extramural care? Although the home care patient is in the less urgent category and does not require (*a*) a major surgical operation, (*b*) heavy and therefore immovable equipment, (*c*) a skilled examination under close hospital observation, or (*d*) the constant proximity of doctor and nurse, does this exclude him and his physician, in time of need, from all ambulatory and portable hospital benefits?

To what extent is clinical interest sustained by continuity of care, and, if it is not supported in this way, why not? What additional stimulants are administered to maintain medical interest?

4. Does the extramural home care patient enjoy the advantages of having his own physician stand by as long as he can afford the fee? What subsidy does the hospital offer to each of them in the home, when the patient is in default with money and the doctor with specialized and more expensive skills? Does the arrangement expose the practitioner to high-grade hospital medicine, or is the plan of collaboration so weak that he continues to remain an outsider, often forfeiting his rights as counsellor and physician to the patient and his family?

5. What opportunities does the home care program offer to the teacher and to the student of medicine, social service, nursing, and the like?

6. What opportunities does the home care program offer to the physician who is interested in the all-around advantages of continuity of care from the point of view of scientific medicine? Are the intramural facilities for research available for the continued benefit of the patient in his home? Are the opportunities of follow-up after hospital discharge exploited to the limit?

7. Is the home adequate, either in its original form or through intelligent subsidy, for a satisfactory home care program? If an individual or institutional substitute for the patient's home must be provided, does it meet these requirements and, what is equally important, does it serve this special purpose or is it regarded as a substitute for the hospital?

8. Does the home care program function within a reasonable radius of the hospital to make adequate medical care and its supervision possible?

9. Are medical and all other facilities available in the home around the clock, or are they limited to routine working hours only? In other words, does the patient under home care enjoy the same 24 hour privileges that are granted to the intramural patient, even though his need for them may be less frequent?

10. What is the length of stay, so to speak, in the extramural service as compared with the intramural service, and does this conform to exact need?

11. Does the home care activity of the hospital have a beneficial influence on the intramural care of patients, and vice versa? In other words, does the hospital, which seems to work under the handicap of impersonality with its intramural patients, make every effort to apply to them the principles of individualization it has learned from experience with the home care patient?

12. What are the relative chances for cure in misplaced cases as between intramural care and extramural care? In other words, does the individualization of effort that characterizes home care, and that is desired for hospital care, add therapeutic benefits in itself? To what extent may poor assignment and location hamper the work of healing?

CHOICE OF PATIENTS

1. Does the roster of diagnoses indicate that patients have been properly classified and assigned to the extramural or intramural hospital service? What are the clinical indications for home care in relation to hospital care? Are they flexible, excessively severe, or casual? In formulating the clinical terms on which a patient may safely be treated in his own home, how strict is the formula and to what extent is it adjusted to suit individual requirements? Can we generalize and make decisions a priori in the presence of pain or discomfort?

2. Is chronicity in itself, or "incurability," a fair reason for home care? In other words, as between the intramural and extramural program of the hospital, does the hospital make distinctions between "acute" and "chronic" without regard to need? Does it provide intramural care for strictly limited periods of time, corresponding to the label "acute," making the duration of the illness rather than the need of the patient the criterion for admission or retention? Or, does it distribute its bounty equitably during all phases of illness, never shying away from the difficult, the stubborn, and the apparently hopeless clinical situations?

3. What does the over-all authority offer in the way of home care to the tuberculous patient and the mental patient, assuming that there is a corresponding activity within the hospital for each of these? Are such patients included or excluded?

4. Is home care subordinated to the fluctuations of intramural hospital bed occupancy? Is the type of patient who can do best under home care transferred to the hospital for the sole purpose of keeping a vacant bed occupied? If so, this is a negation of the fundamental principles of home care.

5. Does the home care program help to break down the outmoded distinctions that still prevail between "acute" hospitals and "chronic" hospitals? It is in an excellent position to encourage the fusion of the two. Duration of illness can lose much of its prevailing influence as a criterion for hospital admission policy where home

care encourages hospitalization only for good cause by providing at home for those who do not need a hospital bed.

### UNIQUE PROPERTIES OF HOME CARE

1. Does the home care program make full use of its unique opportunities in the area of environmental medicine? Does it promote good family ties and help keep families together as much as possible? How do the patient and his family react to home care as compared to the reactions of the other patient and his family within the hospital? What is the relative sum of contentment in each case, or of discontent, and are the lessons learned from experience applied for the benefit of both? Is a hesitant family won over to home care by sympathetic explanations and offers of help? Has the relative responsibility of hospital and family been worked out and stabilized?

2. What is the relative success of home care with (*a*) the acutely sick patient, (*b*) the patient suffering from prolonged illness, (*c*) the convalescent patient, and (*d*) the elderly and the custodial type generally? In other words, are we employing the principles underlying home care to the greatest possible advantage over as wide an area of medical activity as possible?

3. Does the home care program take full advantage of the principles of group medicine, or is the assignment handed over to a junior member of the house staff of the hospital or to an unattached practitioner, as his exclusive responsibility? Will a cross section of intramural and extramural activity show all diagnostic and therapeutic elements of service in proper position?

### RELATIONSHIP TO OTHER GROUPS

1. Does the home care program give to the medical social worker the resource she needs when the hospital has made the decision that a given patient no longer requires a hospital bed? Does it bring physician and social worker together, at long last, and relegate their estrangement to the pages of history.

2. Has full advantage been taken of the services of other health, social, and charitable agencies in the community for the benefit of the home care patient?

3. Is the home care service of the hospital commensurate with the housing resources of the community? Does it make the fullest use of existing residential facilities? (Home care, which lends itself to inexpensive expansion, is dependent on the quality of the residential housing of the area in which it is conducted. Additional hospital beds are purchasable only at much greater cost.) Every bed that is won for the home care program, directly or by subsidy, makes the further extension of the program easier, if only by its moral example. Up to a certain point, the better the housing the less the need for an expensive hospital bed!

4. Has the home care program been popularized and publicized to the point of maximum response, and have its lessons been learned and taught inside and outside of our professional schools for wider application?

### FINANCIAL ASPECTS

1. Experience has thus far proved that the cost of extramural care, on a comparable basis, is about one-fourth that of hospital care. Regardless of the immediate burden of responsibility for this cost, either to the patient or to the hospital, has the community benefited financially, as well as in other ways, on an over-all basis? In other words, is home care expensive or inexpensive in relation to the total effort?

2. Does the home care program exist on a hand-to-mouth basis, uncertain of its financial status, or is the budget for its maintenance completely integrated and absorbed in the regular budget of the hospital? Capital funds are not required for the establishment of a home care program. Budgetary funds should be allocated in accordance with relative need. Extrabudgetary funds should also be available for the pursuit of education and research with this group of patients. To what extent does the home care program conform to these requirements?

3. Does the home care program maintain a reasonable proportion between (*a*) the patient contribution, (*b*) the philanthropic contribution, and (*c*) the government contribution toward the cost, in the same way that such things are ordered within the hospital? Are subsidies available in easily defended proportions?

4. Is the hospital staff that is assigned to home care adequately paid for its work in money and in opportunity, or is this another chore that causes the exploitation of free or underpaid service? To put it another way, is home care a "stepchild" in the hospital setup or an equal in all respects in its claim on hospital attention?

5. Have the medical and financial possibilities of home care been considered to the full in connection with a prepaid voluntary health insurance plan?

6. Does the home care program have subsidy from government for the care of public charges on the same basis as the intramural program, with the understanding that this is to continue as a nongovernmental voluntary effort intended to benefit the patient and the physician who is responsible for his care?

These are only some of the questions that should be on our minds as we evaluate home care. Others will doubtless arise as the work of inspection, evaluation, supervision, and control progresses. The agenda for the conference on home care is still rich in content at this writing.

84 Gun Hill Rd. (67).

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**Mechanical Psychiatry.**—We as physicians have a grave responsibility to those patients who become emotionally disturbed and to their families. The choice of a psychiatrist with good training and judgment is just as important as the selection of a good surgeon. Families of patients are helpless and are willing to go to great lengths to wrest their loved ones from a mental illness. We must not allow these patients to fall into the hands of incompetent or unscrupulous individuals.

Some so-called psychiatrists seem to have forgotten that electric shock therapy is a tool for establishing contact with a patient so that psychotherapy may be instituted. After a ten to fifteen minute interview they prescribe and administer shock with little or no follow-up psychotherapy. The patient, as a consequence, loses his will to fight and turns to shock therapy whenever the going becomes rough. . . .

Most psychiatrists are careful, conservative men. To the minority who are not, we must show our displeasure by refusing to entrust patients to them.—Mechanical Psychiatry, editorial, *Journal of the Medical Association of Georgia*, November, 1953.

# CURRENT TRENDS IN EXAMINATION PROCEDURES

*John T. Cowles, Ph.D., Princeton, N. J.*

I would like to present this subject not so much as a member of a particular organization engaged in the development and administration of testing programs, but rather as a representative of the relatively new field of specialists in tests and measurements of human behavior. In the course of discussing testing procedures and problems with a few specialty board members, I have discovered that we have a common area of keen mutual interest, namely, the development of the best possible techniques for selecting candidates for responsible places in society. I have been asked to report on a number of new and promising ways of improving examination procedures; these may, if given a sound trial, prove quite useful in the future to medical examining boards.

While the systematic study of test methods is not new—it probably started with the German psychophysiologists in the past century—it is only quite recently that literally hundreds of persons trained in statistics and in psychological and educational measurement have worked together in coordinated programs of aptitude, achievement, and personality testing, much of it research in nature. The greatest impetus to the study of tests and measurements took place during the past two wars, when we were compelled to devise more efficient recruit selection and classification and evaluation of training. It took 19 closely written volumes, for example, to summarize the Army Air Forces wartime test research and development program under Col. John C. Flanagan of the air surgeon's office.[1] A casual look at this summary shows the great number and range of measuring devices that were tried out, not only paper-and-pencil tests but also apparatus tests, rating scales, and other techniques that were found to have validity for the selection and utilization of manpower. Nearly every phase of normal human behavior was touched on in the military test research programs of World War II—sensory discriminations, intellectual aptitudes, perceptual and psychomotor abilities, learning and problem-solving performance, emotional stress, job proficiency, personal and social adjustment, and leadership. Much of it concerned rather complex, often strange, job specialties. It must be emphasized that this was not simply a wholesale test construction process; marked advances in test theory and in new statistical techniques were an important accompaniment of this large-scale exploration of the field.[2]

It is not at all surprising that the lessons learned during military need have subsequently been found very useful in many civilian situations and that the science or art of the test specialist has now come into its own. Educators have, since Socrates, indulged in the art of testing; it is an essential part of teaching. The readiest applications of the new test techniques were, therefore, in the educational field; but improved tests have within the past decade demonstrated their worth as aids to the selection of engineers, lawyers, teachers, and postdoctoral research fellows, to name a few. Similar approaches to testing are now being applied with promise of comparable success in the licensing of physicians and in the certification of medical specialists. Perhaps the easiest gains in improved testing are realized when objective, multiple-choice tests are adopted by a selection board for evaluating the verbalized learning and comprehension of candidates. However, I am particularly anxious to point out the possibilities of improving oral and practical examinations. It is my conviction that good testing techniques are not yet in full use by many selection boards that could profit from their use, possibly because of misconceptions about the nature of present-day tests; these misconceptions could be due to the customary but regrettable lag in communication across specialized fields.

During the past five years, I have participated rather directly in cooperative projects of test development for the Association of American Medical Colleges, the National Board of Medical Examiners, and, quite recently, one of the medical specialty boards. Specialty boards have a kind of ultimate responsibility: they must select those highly trained and experienced candidates who qualify only at highest standards for exceedingly complex, technical, and socially vital roles in the medical profession. In short, they are privileged to select from among the elect. Nevertheless, from my standpoint, I would say that specialty boards probably experience examination problems that differ principally in degree from those faced, and certainly not yet fully solved, by medical educators dealing with those stages of training that are but preliminary to certification in a specialty. Medical educators, too, commonly set and grade written, oral, and practical examinations. The test specialist can, I believe, lend valuable aid in providing a board with sound methodology and appropriate techniques of development, administration, and interpretation of examinations so that the board can better discharge its responsibility. A test specialist cannot, of course, presume to set standards, specify examination content, or interpret the full qualitative significance of examination results; these are the rightful tasks of the board.

As the secretary-treasurer of the Advisory Board for Medical Specialties, Dr. B. R. Kirklin, has concisely stated them, the purposes of the approved examining boards in medical specialties "were, primarily, to establish minimum standards of graduate education and training requirements for physicians representing themselves to the public as being specialists, with certification by the boards of candidates after they had been able successfully to pass the boards' examinations. Secondarily, these boards hoped to improve the general standards of graduate medical education and facilities for special train-

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Read at meeting of Advisory Board for Medical Specialties, 50th Annual Congress on Medical Education and Licensure, Chicago, Feb. 7, 1954.

1. Flanagan, J. C., and others, editors, Army Air Forces Aviation Psychology Program Research Reports, U. S. Government Printing Office, 1947-1948.

2. Thorndike, R. L.: Personnel Selection: Test and Measurement Techniques, New York, John Wiley & Sons, Inc., 1949.

ing." [3] The examinations are obviously the crucial feature of the boards' operations. These examinations are typically done in four parts or stages—the preliminary qualifications, the graduate training requirement, the written examination, and the oral and practical examination. Each stage is usually prerequisite to the next.

## FUNCTION OF EXAMINATION

What, then, are the principal functions of this complex examination procedure? As I view it, these may be stated as: (1) to make explicit, or give working expression to, the standards of the examining board and (2) to measure the competence of individual candidates with respect to those standards or, more precisely, to discriminate between the qualified and the unqualified candidate. A third, and perhaps less important, function of the examination is to reveal adequacies or inadequacies of medical education and training for the specialty and to show trends in the caliber of candidates. This information can be a highly informative by-product of good testing procedure.

How can good testing principles be applied to specialty board examinations to help them fulfill these purposes or functions? Rather than quote from extensive studies at this point, I shall generalize a bit and later illustrate with a few specific examples.

*Objectives and Standards.*—The examination must as a whole accurately reflect the board's standards of certification in the specialty. This is the "validity" of the examination or the degree to which it measures what it purports to measure. In the absence of an ultimate, quantifiable criterion measure with which we might correlate the examination results, and we have no such criterion of successful specialized medical practice, we must depend for assurance of validity of an examination on the way in which it is constructed and administered. We have found from long experience that the first step in devising a good examination is for the examiners to sit down and write out in detail the behavioral objectives to be tested by the examination; this is not simply an outline list of topics, with proportions of each to be covered, but an outline of the critical functions, mental processes, behavioral activities, or other performances that should be tested. This should be done for any test, whether written, oral, or practical. It is virtually impossible to prepare a good examination if only a file of questions is matched against a topical outline. Why? Because we cannot devise appropriate types of questions, questions that elicit important processes beyond knowledge of facts, unless the examiner states beforehand what the important functions are that must be tested. When he does so, the test technician and often the examiner himself can ingeniously devise kinds of questions that really require the exercise of those functions and discard those that depend on trivial processes. As an illustration, the multiple-choice question that follows sounds well, but all it requires is factual knowledge of the topic:

The process by which a ray of white light is broken up into a spectrum by a prism of colorless glass is called

(*a*) refraction
(*b*) diffusion
(*c*) reflection
(*d*) diffraction
+ (*e*) dispersion

Here is the same topic tested in a way that requires the candidate to perform an act of understanding, not mere recall. He must make reasoned judgments, as he might in real life:

A ray of white light is broken up into a spectrum by a prism of colorless glass because

(*a*) white light is a composite of many frequencies
(*b*) the angle of incidence exceeds the critical angle of glass
(*c*) the glass absorbs certain frequencies but not others
+ (*d*) the amount of refraction differs for light of different wave lengths
(*e*) white light from an incandescent solid produces a continuous spectrum

The writing of good examinations is exacting work, and it cannot be wholly delegated to a testing agency or to an individual physician writing alone. In fact, when medical specialists get together around a conference table to write and review their examination questions, with the aid of test specialists, they almost invariably produce a more valid examination, one that better tests the objectives or standards of that specialty.

*Critical Behavior.*—There are some other rather basic suggestions that may increase the validity of an examination. The candidate should be called on to perform exercises that reveal abilities, knowledges, or skills that are critical to successful practice of the specialty and that are not answerable on the basis of irrelevant cues or irrelevant accomplishments. The examination should in all consist of a balanced and representative sample of the performances characterizing the well-trained specialist; many questions are better than few, because of the vagaries of chance when only a few are asked. A single operative performance hardly establishes the quality of a lifetime of operations to follow. The candidate's task should be clear and unambiguous, and the basis for grading should be entirely clear, at least to the examiner. Letters of recommendation, incidentally, usually fail to serve as valid measures, even when specific questions are asked the recommender.

*Revision.*—A further requirement of a valid examination is that it be revised frequently, not only for security but for keeping it up-to-date and alive to the best in medical practice. In short, validity of a specialty board examination is assured only if it adequately reflects the critical components of behavior that characterize the competent specialist.

*Fairness.*—The next mark of a sound examination is its fairness to all candidates. This is easier to achieve in a written than in an oral or practical test, but even in the latter we can take certain precautions that may insure that standards do not fluctuate from test to test and from candidate to candidate. This characteristic refers to the "reliability" of an examination, its accuracy and stability of measurement, so that it is a rigid yardstick

3. Kirklin, B. R.: Approved Examining Boards in Medical Specialties, J. A. M. A. 153: 389 (Sept. 26) 1953.

and not an elastic one. Most oral examinations are notoriously unreliable. Does a passing grade (or any other grade) on this examination mean, for example, the same as a passing grade on another examination occasion? Is grader-to-grader variability minimized?

If the same caliber of candidate is graded differently on different occasions, or by different examiners, then the examination is unreliable. How can we prevent this? 1. Insure that the examination includes enough questions to compensate for chance performances. 2. Make sure that there is equivalence in scope and difficulty from one examination to the next. 3. Be sure the instructions to different examiners are very explicit, to insure unvarying examination procedure. 4. In the oral and practical examinations, always have more than one examiner and require independent judgments of them on predefined aspects of candidate's performance. 5. Use objective rating or grading techniques wherever possible.

*Differentiation.*—Another trait essential to a good examination is that it measures, in the sense that it clearly differentiates persons of varying competence. Obviously, if the examination fails to differentiate individuals sufficiently, then decisions as to relative competence are either impossible or capricious. The simple question is, "Does the examination provide a distribution of grades that clearly separates candidates who differ in ability?" To accomplish this, the examination must be properly constructed in terms of appropriate difficulty of the component parts or questions, and grading must not reduce to a set of averages that show little numerical range.

*Analysis.*—An equally important characteristic of good examinations is that they must be subject to thorough analysis. Unless an examination can be statistically analyzed, we will never know how really poor it may be. Unless we know which part is failing to do the job it should, we cannot improve the examination. It is here that oral and practical examinations usually present serious problems. Wherever these examinations can be made more objective, they lend themselves better to analysis and improvement. Objective, written examinations are easily subjected to such analysis, question by question.

A point that is really a corollary to all the foregoing points is that if the examinations yield reliable, meaningful, and comparable measures we may then review differences or trends in the performance of successive groups of candidates and, possibly, on various parts of the examination. The board thereby accumulates very useful normative data. We might even make inferences as to the adequacy of preparation of candidates with different kinds or amount of training. Although there are serious pitfalls to be avoided, this is now being done successfully with certain of our standardized written examinations in the medical field.

These are a few of the many sound and efficient practices in testing, and they are founded on fairly numerous and definitive studies.[4] These, I believe, can be applied to great advantage by specialty boards.

## TESTING TECHNIQUES

The question may be asked, "Just what are some of the test techniques by which we can fulfill these technical requirements for sound tests?" First, I might say I am not sure that the time devoted to each phase, written, oral, and practical, is as efficiently spent as it might be or that each phase validly represents corresponding components in the specialists' daily practice. Several specialty boards have adopted objective written tests of the multiple choice variety. If properly constructed, with direct participation by the examining board itself, the multiple-choice test appears to be a great improvement over ordinary essay tests.[5] The advantages and disadvantages of the multiple-choice versus written essay tests have been rather thoroughly reviewed in a panel on objective, multiple-choice tests at the 1951 Congress on Medical Education and Licensure.[6] As John Stalnaker has explained, the accurate and objective grading of a well-developed essay test requires great forethought, labor, and specially trained multiple graders. But this is almost never done.[7] It is doubtful that essay writing behavior in itself is critical to successful medical practice, and the functions of organization and interpretation of knowledge, which essays supposedly test, can now be measured more adequately by the newer kinds of objective tests. Dr. Robert A. Moore, president of the Advisory Board for Medical Specialties, has recently demonstrated that the objectives and content of a typical essay question in pathology can be fully realized and even more objectively, quickly, and penetratingly measured by a few well-constructed, multiple-choice questions of newer type.[8]

It is more than historically significant that the National Board of Medical Examiners, widely representative of medical education and practice, has now adopted multiple-choice, written examinations in place of all its former essay examinations. In view of the demonstrated superiority of the newer examinations in validity, reliability, and efficiency, the change was not only logical but inevitable. The new examinations incorporate case studies and other elaborate types of questions requiring complex reasoning, application of principles, and interpretations by the candidate—not mere recall of facts.

## ORAL EXAMINATIONS

So much for the written test of those components of specialist performance that can best be tested in writing. In turning to the oral examination, one consideration is whether time is wasted asking questions orally that can be evaluated better in a written test. Present written tests cannot, however, be expected to measure directly the psychomotor or manipulative proficiencies exhibited in oral and practical performances. The oral and prac-

4. Lindquist, E. F., editor: Educational Measurement, Washington, D. C., American Council on Education, 1951.

5. Cowles, J. T., and Hubbard, J. P.: A Comparative Study of Essay and Objective Examinations for Medical Students, J. M. Educ. **27**: 14 (May, pt. 2) 1952.

6. Medical Education in the United States and Canada: II. Proceedings of the Annual Congress on Medical Education and Licensure, Panel Discussion: The Objective or Multiple Choice Type of Examination, Chicago, the American Medical Association, 1951, pp. 45-60.

7. Stalnaker, J. M.: The Essay Type of Examination, in Educational Measurement, Washington, D. C., American Council on Education, 1951, pp. 495-530.

8. Moore, R. A.: Methods of Examining Students in Medicine, J. M. Educ. **29**: 23 (Jan.) 1954.

tical examinations seem very complex and may yet have high validity, from the standpoint of being situations closely resembling, if not in actuality duplicating, situations commonly faced by a practicing specialist. However, the oral and practical examinations present certain inherent problems of measurement, and it is evident that oral and practical examinations have not yet had their full share of test research. Certain interesting studies have indicated that improvements in oral examining techniques can be developed. The American Board of Preventive Medicine and Public Health, for example, has adopted some rather sound techniques aimed at making the oral examination as objective and reliable as possible. Multiple examiners are used, characteristics to be judged are predetermined, ratings are made on a uniform scale, and the results of the entire examination are converted to punched cards that present a profile chart showing the strengths and weaknesses of each candidate.[9] This, I would say, is a very enlightened approach to the grading of the oral examination.

How can the oral and practical examinations be further improved? There is no quick success here. Much research needs to be done, and foundation support will doubtless be needed before major gains are realized. Just how far we can go in making oral examinations more objective is hard to predict. I have great confidence that physicians and test experts can work out together some effective, objective measurement devices to test many of the critical functions, and these objective devices may be quite unlike the present oral or written examinations. Before this can be done, however, there needs to be a rather thorough study of just what the critical behaviors are that are presumably being elicited and measured in the oral and practical examinations. A new technique of analysis of complex jobs, which provides a basis for testing, has already been very profitably used by the American Institute for Research in the fields of scientific research, engineering, and (for high level persons) aviation and industry.[10] The same technique has been applied recently in the medical field by Paul Diederich to determine in behavioral terms just what constitutes a good practicing physician, what does he do, and what does he avoid doing? An illustration of this technique [11] is in order.

To find out what the critical behaviors in medical practice are, 24 outstanding physicians in a large urban community were interviewed for an hour or more and were asked to recall specific incidents in the practice of medicine that they had strongly approved or condemned. If there was any doubt about the significance of an incident, the physician was asked to add his interpretation. Several hundred incidents were recorded during these interviews and were abstracted and classified afterward into several main categories, namely physician-patient relationships, relationships with other members of the profession, concern for community health problems and use of community resources, relationships of medicine to government, personal (ethical) behavior, and basic knowledge and technical competence. Subheads under these main headings, together with illustrative incidents, now provide a check-list of specific descriptions of "critical behavior" in the practice of medicine. This can now serve as a rating scale or measure based on the occurrence of such incidents in students or candidates for examinations. This check-list of critical behavior can also provide a realistic criterion against which other measures, such as selection tests, can be validated. This technique, it seems, would have very direct application to the outlining, by a board, of standards and objectives for a medical specialty. The board members could themselves furnish the critical incidents or could elicit such incidents from their associates in the specialty as a basis for behavior categories. The next step, of course, is to devise suitable testing instruments that could be feasible for inclusion in the examination procedure.

Another real hope for improving oral and practical examinations seems to lie in standardizing the examination situations or cases that are presented to the candidates. I refer to the possibility that examination situations might be made more nearly uniform from candidate to candidate. This should be possible, at least for certain specialties, without interfering with the observation of critical behaviors that are now being elicited in varying clinical situations. One possibility is to present complex examination material with motion picture film or sound film. This is suggested by the success with which motion picture visual aids have been developed by the committee on audiovisual education of the Association of American Medical Colleges. Film presentation of practical test situations was successfully tried by Gibson and his Army Air Force colleagues during World War II.[12] Good film presentation provides striking advantages of standardized presentation but is, like some other objective tests, rather difficult and expensive.

Still another promising approach to standardization of the practical examination is a fairly objective, situational type of test now being tried out by Educational Testing Service for selecting and evaluating high level administrators. Adapted to the medical specialist test situation, the candidate might be presented with all the various documents and records that go into a patient's file, plus the substance of telephone messages and other oral communications from the patient, relatives, nurses, interns, or other physicians. With these various documents in hand, the candidate is required to study the whole case and make various decisions, such as whether to operate, when to operate, by what technique, what further information is needed, possible complications, and general prognosis for the patient. He can be graded quite objectively on specific skills in bringing together these various sources of information, analyzing them, and making professional decisions. Some research on this type of examination might indicate its feasibility and would indicate how the grading could best be conducted.

9. Stebbins, E. L.: American Board of Preventive Medicine and Public Health, in Medical Education in the United States and Canada: II. Proceedings of the Annual Congress on Medical Education and Licensure, Panel Discussion: The Objective or Multiple Choice Type of Examination, Chicago, the American Medical Association, 1591, pp. 53-57.

10. Flanagan, J. C.: The Critical Incident Technique, Psychol. Bull. **51**: 327 (July) 1954.

11. Diederich, P. B.: Critical Incidents Technique Applied to Medicine, Educational Testing Service Developments, Princeton, N. J., Educational Testing Service, October, 1952, no. 3.

12. Gibson, J. J.: Motion Picture Testing and Research, Army Air Forces Aviation Psychology Program Research Report No. 7, U. S. Government Printing Office, 1947.

Let me now illustrate even more specifically how one critical function in the oral and practical examination might be made much more objective. This particular test is being developed by Dr. H. J. A. Rimoldi, research associate on the Educational Testing Service staff, with assistance from myself. It is based on a similar test idea previously tried out by Glaser and associates in the field of trouble shooting in electronic equipment maintenance.[13] Our present version promises real usefulness not only in its medical test application but also in the form of a research tool for studying complex mental processes. So far, it has been tried on only a few physicians, but it has elicited keen interest and has appeared quite practicable to the physicians and to the test specialists. It needs thorough trial and refinement, of course. We feel that similar test ideas can fruitfully be devised if present examinations are explored for objectively testable features.

Let us first assume that one of the critical behaviors for a medical specialty is the ability to choose, and to do so in proper sequence, the appropriate clinical and laboratory tests and other information to arrive most directly at the correct diagnosis in a hospitalized patient. The test specialist and the physician now jointly plan a suitable, but untried, test of that ability. The test consists of certain preliminary information presented to the candidate. The information describes the case as of the time the patient is admitted to the hospital. A brief case history and admissions data, including the patient's principal complaint, are given. The candidate then sees on a display folder an array of optional medical examination procedures, questions asked of the patient, laboratory tests, or other tools of diagnosis—as he might select in a real clinical situation—each presented on a separate, removable card. His problem is to choose from these "items," in whatever number and sequence he deems necessary and sufficient for establishing a firm diagnosis of the case, even if he has some final reservations because of lack of certain desirable information. After he chooses each item and reads the information presented on the reverse of the card, he places the card face down on a spindle; this preserves the sequence of his choices and leaves the information in view for later reference.

The particular case illustrated in this specimen test is one drawn from an actual case in the field of obstetrics and gynecology. Any other suitable case might have been used. The cards include items both relevant and irrelevant to a skillful diagnosis; their arrangement, although roughly grouped into logically related information such as items of physical examination or items of laboratory tests, is quite arbitrary and unrelated to best diagnostic procedure. The information on the reverse of each card may consist of the patient's verbatim answer, an x-ray film, an observational statement of the intern or nurse, a laboratory test result, clinical sign, electrocardiograph, or any other information that can be translated into words or pictures. Several such cases varying in difficulty and complexity can be prepared for successive administration to the same candidate in separate card sets. Revision is easy so as to incorporate new diagnostic techniques or information. The test is very flexible; it cannot, of course, evaluate the manipulative techniques performed by a physician to obtain such information.

The scoring can be accomplished by recording the sequence of cards chosen by the candidate and his diagnosis. His score can be a measure of the extent to which he agrees with the diagnostic sequence and final diagnosis demonstrated by, say, 50 to 100 practicing specialists or other criterion group who previously will have taken the test. More elaborate scoring can reveal the diagnostic process in greater detail by taking into account the number of unnecessary choices of items by the candidate, his time to arrive at the diagnosis, his type of errors, and so on. This kind of test lends itself readily to such interesting analyses as the variety or the agreement of orders in which many specialists or candidates select a single item. It would be quite significant if certain information is always chosen very early, another item chosen at almost any time, one item never chosen by the practicing specialists, and another frequently chosen by new candidates. Knowing which items are usually associated with correct diagnosis by candidates and the frequency and type of their errors might provide clues to improved diagnostic procedure and its teaching.

## SUMMARY AND CONCLUSIONS

These brief statements suggest that a new test technique might go a long way not only in making the oral or practical examination on medical material more objective and more easily analyzed, so that selection of candidates is improved, but also in providing data for more precise analysis of their training for the specialty.

It does not seem too hopeful to expect that concerted research into what are the critical functions that distinguish the successful specialist, followed by development and thorough trial of new kinds of tests of those functions, may indeed lead to substantial improvement of the oral and practical examinations. So far, effort has been focused almost exclusively on the improvement of the written examinations, with the result that there has lately been expressed some lack of faith in the oral and practical. Unless we improve the latter, we are in danger of giving them little or no weight in the examination procedure, when in fact they may be the most real and significant part of the examination and should be of as high quality from all technical test aspects as are many of our objective written tests.

20 Nassau St.

13. Glaser, R.; Damrin, D. E., and Gardner, F. M.: The Tab Item: A Technique for the Measurement of Proficiency in Diagnostic Problem Solving Tasks, University of Illinois, College of Education, Bureau of Research and Service, June, 1952.

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**Heart Disease.**—Many ideas about the heart which have been held for hundreds of years have been proved to be wrong, and we owe a great deal to the accurate observations of . . . James Mackenzie, who showed that the heart should be judged on what it can do and not so much on what is heard by the stethescope. Almost invariably, when a layman hears of a person who has heart disease he remarks: "He has worked too hard." Many men begin to slow down after the age of forty years in order to prevent heart disease or hardening of the arteries. In my opinion there is no justification for these views. I was pleased to read what Dr. Paul D. White said at the recent annual meeting of the American Medical Association: "The general warning to stop all exercise at the age of forty seems to me ridiculous." (Dr. White, at the age of sixty-seven years, still hunts whales.)—F. A. E. Lawes, Heart Disease in Industry, *The Medical Journal of Australia*, Feb. 13, 1954.

# CONTROL OF TRICHINOSIS BY SANITARY GARBAGE DISPOSAL

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A review of the proceedings of the First National Conference on Trichinosis and a review of the program of the second conference indicate that the epidemiological aspects in the control of trichinosis have been, or will be, covered rather thoroughly. As an introduction to the control of trichinosis by sanitary garbage disposal, however, it might be well to review briefly the characteristics of Trichinella spiralis, which enable it to complete its life cycle when it is present in garbage.

First, the larvae are encapsulated and are imbedded in the muscle fibers of the animal during life and therefore are present in the slaughtered carcass. They may remain viable in fresh pork under normal conditions of storage. Second, there are no grossly visible indications of the presence of the parasites in the carcass, individual cuts of meat, or meat scraps, nor is there any practical method of determining their presence so that the affected portions can be removed and treated to kill the organisms. Third, the life cycle is completed when raw or inadequately treated garbage containing infected pork is consumed by swine.

It might be well, also, to review briefly the problem caused by the presence of Trichinella spiralis in garbage wastes. Studies recently reported by Dr. Benjamin Schwartz indicate that the incident rate of trichinae in hogs fed raw or uncooked garbage is over 11% and in midwestern swine having occasional access to garbage about 0.6%.[1] These studies show also that the degree of infestation in the individual carcasses of midwestern swine is relatively light as compared to hogs fed raw garbage. The problem, then, as pointed out by Dr. Schwartz and others, is primarily caused by the feeding of garbage containing viable trichina larvae.

What is being done to solve or eliminate this particular aspect of the spread of trichinosis? In order to prevent the spread of diseases including trichinosis, 41 states now have laws or regulations that require that garbage be cooked prior to feeding to swine. In some of the remaining states, action is being taken to pass similar legislation. Such legislation in most states is based on the heat-treatment standards originally developed by the Public Health Service for the destruction of trichinae in garbage.

The control of trichinosis by means of proper garbage disposal may be divided into two main categories, namely: (1) disposal of trichinae-infected material so as to be inaccessible to swine and (2) destruction of the trichina larvae before the infected garbage is fed to such animals. Specific methods of garbage disposal under these two broad classifications will be discussed briefly from the standpoint of effectiveness and general practicability.

## PROPER GARBAGE DISPOSAL

Methods of disposal of garbage so as to render it inaccessible to animals are (1) incineration, (2) burial or sanitary landfill, (3) grinding and disposal with sewage, (4) composting, and (5) reduction for salvage of animal fats. These methods of disposal of refuse, such as garbage and rubbish, are very effective from the point of view of disease prevention and are relatively easy to regulate.

Incineration and sanitary landfill are widely practiced today. The former is used primarily in the larger cities, where the costs of transporting the garbage beyond the congested areas are high. The latter is particularly suitable for use by smaller cities having small amounts of wastes, but is also used by some large cities. The approximate relative costs in Ohio for garbage disposal (excluding hauling to disposal site) were reported as 55 cents per ton for sanitary-landfill operation and $2.68 per ton for incineration.[2] The average cost in seven California cities for disposal by sanitary landfill was 81 cents per ton,[3] while in St. Louis the cost was but 18 cents per ton.[4] The U. S. Public Health Service has found that, when equipment depreciation and administrative expenses are considered, costs for disposal of garbage and other refuse by sanitary landfill are about 75 cents per ton for the average community.

The grinding of garbage is becoming increasingly popular on the individual household basis because of its convenience. While a few cities have encouraged its use on a city-wide basis, adoption of this method by many cities has been slow because of the immediate or initial costs of installing the grinding units in the individual households and of increasing the capacity of disposal plants to handle the additional load, and because of the problems encountered with respect to the installation and maintenance of individual mechanical units on private property. Also, the problem of disposal of the bulk refuse remaining still must be solved by other means. It has been estimated that the added cost of garbage treatment in the sewage-treatment plant in Washington, D. C., would range from 87 cents to $1.20 per ton, not including the cost of the individual grinding units.[5]

Composting is not yet a generally utilized method of solid-waste disposal in this country. However, considerable biological, biochemical, and engineering research

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Read before the Second National Conference on Trichinosis, Chicago, March 1, 1954.

1. Schwartz, B.: Trichinae in Swine, Proceedings of the First National Conference on Trichinosis, distributed by Veterinary Public Health Section, Epidemiology Branch, Communicable Disease Center, Public Health Service, Atlanta, Ga., 1952.

2. Summary Report on Municipal Garbage and Refuse Conditions in Ohio (1950-1951), Ohio Department of Health, Columbus, Ohio, Oct. 1951.

3. An Analysis of Refuse Collection and Sanitary Landfill Disposal, Technical Bulletin No. 8, Sanitary Engineering Research Project, University of California, Berkeley, Calif., Dec. 1952.

4. Report of Committee on Refuse Collection and Disposal, American Society of Civil Engineers, Sept. 1953.

5. Gunderson, N. O., and others: A Study Report on the Use of Domestic Garbage Grinders at Rockford, Illinois, Special Report No. 4, American Public Works Association, Chicago, 1948.

on composting refuse is now being carried on by universities and other organizations, and suitable methods may be developed in the not-too-distant future. In its present stage of development in this country, it cannot be considered a possible method of refuse disposal, on a par with incineration or sanitary landfill. Likewise, reduction of municipal garbage for the purpose of salvaging animal fats has practically been abandoned because of the economic factors involved.

### DESTRUCTION OF TRICHINA LARVAE

Regarding the second category of means of providing proper garbage disposal to prevent the spread of disease, consideration will be given to the following: (1) dehydration, (2) reduction, and (3) cooking. Work done by the Public Health Service on the microbiological efficiency of the dehydration of garbage by a commercial firm in Omaha indicated that the trichinae were destroyed, as determined by the digestion method.[6] Results of this study will be reported in the near future and will contain detailed data on the survival of trichinae and other pathogenic organisms in the dehydration process. However, for economic reasons, dehydration cannot be expected to become a widely used method of garbage disposal, at least for the present.

Reduction is employed commercially in the manufacture of dry feeds, but, as previously stated, its use is practically extinct in this country as a means of garbage disposal because of economic factors. Since neither dehydration nor reduction now is generally used or considered practical as a means of treating municipal wastes, it is believed that the discussion, at this point, should be devoted primarily to garbage-cooking.

The cooking of garbage is becoming increasingly prevalent as laws or regulations are placed into effect requiring that garbage to be fed to swine be heat-treated in equipment that will insure the heating of the garbage to a specified temperature for a certain period of time.[7] The time-and-temperature standards recommended by the Public Health Service require the heat-treatment of all garbage to 212 F (or boiling) for a period of 30 minutes. Such cooking is now generally accomplished by means of (1) a stationary vat designed either for heating by direct fire, steam injection, or steam recirculation system or (2) a truck-body so designed and equipped that it can be connected to an adequate supply of steam for the cooking of the contents by steam injection, or a steam recirculation system.

A bulletin issued jointly by the Agricultural Research Administration and the Public Health Service, entitled "Equipment for the Heat-Treatment of Garbage to Be Used for Hogfeed" (May, 1953), and Supplement No. 1 to this bulletin (Feb. 1954) [8] contain a large amount of information with respect to standards for design and operation of equipment used for the heat-treatment of garbage. The supplement points out that the actual costs for cooking equipment, labor, and fuel vary considerably, according to the size and type of operation. The average cooking costs reported to the Department of Agriculture are $7.73 per ton, with direct-fire equipment, and $2.71 per ton, with steam-cooking equipment. Initial equipment costs (not included in the above figures) are reported to vary from $21 for cooking 25 lb. of garbage per day by direct fire, to $2,800 for cooking 6 tons of garbage per day by steam injection.

The fact that 41 states now have legislation requiring heat-treatment of garbage fed commercially to swine has provided state authorities with the legal right to set up sanitary garbage-feeding standards. The job of setting up and conducting an effective program, however, is no small one. According to data furnished by the Department of Agriculture and included in Supplement No. 1 as referred to above, there are in excess of 12,000 persons in this country feeding garbage to hogs. Although half of these are reported to be cooking garbage, the number who are effectively cooking the garbage is not known. There remains a need for further study of cooking procedures, feeding-farm layouts, and operations, so that other potential health problems, such as insect control, rodent control, and stream pollution, may be corrected or averted. Although tremendous progress has been made in the past year and a half, the program has just begun and much remains to be accomplished. With all concerned persons working together, the goal will most surely be attained. The Public Health Service will strive to do its part by a continuing program for furthering the adoption of other sanitary methods of garbage disposal, and by assisting in the development of engineering criteria for the design of safe and sanitary feeding plants and heat-treatment equipment.

At the present time, Iowa State College at Ames is engaged in research on methodology, equipment, and survival of pathogenic organisms (including trichinae) in the heat-treatment of garbage for feeding swine. With this and possibly similar research, in addition to the cooperative efforts of regulatory agencies, disease-control officials, and the persons who feed swine, it is our earnest hope that the perpetuation of trichinosis through feeding raw garbage to swine soon will become a matter of history in the United States.

6. Progress Report (July, August, September, 1953), Communicable Disease Center, Public Health Service, United States Department of Health, Education, and Welfare, Atlanta, Ga., 1953.

7. Suggested Guide for Drafting a State Act Regarding Feeding Untreated Garbage to Swine, Division of Sanitation, Bureau of State Services, Public Health Service, United States Department of Health, Education and Welfare, Washington, D. C.

8. Equipment for the Heat-Treatment of Garbage to Be Used for Hogfeed, Agricultural Research Administration, United States Department of Agriculture and Public Health Service, United States Department of Health, Education, and Welfare, May, 1953. Supplement No. 1, Feb. 1954.

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**Nutrition.**—When we learn to eat day after day, month after month, year after year all the essential nutrients, a higher degree of health will result, there will be a marked decrease in the degenerative diseases, and a prolonged, healthy life span will follow. Progress of the science of nutrition and growing knowledge of vitamins, minerals, and enzymes places the physician in possession of facts that enable him to prevent and control the ever-increasing danger of degenerative diseases in geriatric patients. Food intake should be based on what materials the body needs for its health and efficient function rather than on present-day perverted taste habits. The diet should be low in carbohydrate, low in fat, high in proteins, and high in foods that contain natural vitamins and minerals, such as whole grain products in the form of bread and cereal, fruit and fresh vegetables, and the intake of refined foods and sugars must be restricted or eliminated.—W. C. Martin, M.D., Essential Nutrition in Geriatrics, *International Record of Medicine*, September, 1953.

# FUTURE OF THE SANITARY LANDFILL

*A. D. Moore, Ann Arbor, Mich.*

On Dec. 15, 1952, the First National Conference on Trichinosis made it clear that the widespread practice of feeding raw garbage to swine was the major link in the transmission of trichinosis. Between then and now, in a period of little more than a year, there has been a truly spectacular rate of adoption of acts by state legislatures, by which feeding of raw garbage is now forbidden in most states. There is almost no connection between the two sentences above.

## VESICULAR EXANTHEM EPIDEMIC

Well then, what did happen? Did the legislatures finally and at long last respond to advice given by the United States Department of Agriculture? No. Did they finally respond to the advice given by their own state departments of agriculture? No. What "happened" was vesicular exanthem, a swine disease, which, unlike trichinosis, is not even transmissible to human beings. This virus disease spread in the country at wildfire rate. It was soon established that, like trichinosis, its main link of transmission to swine was through the feeding of raw garbage. Vesicular exanthem not only hit the large herds of the garbage-feeders, but, because of its infectiousness, quarantines were called for that stopped the shipping of grain-fed swine out of many areas. That affected the farmer's pocketbook. Without hesitation the farmers turned on the legislators, and in most of the state capitols they responded with a speed and unanimity that is seldom witnessed.

Thus it is that a purely economic problem concerned with the swine disease vesicular exanthem may have done more than anything else to help bring the public health problem trichinosis under control. However, two things must be remembered. Vesicular exanthem attacks the hog but does not attack the human being. Trichinosis attacks both, but oddly enough, while it cripples or sometimes destroys the human being it does not seem to hurt the hog. Therefore, let us not fall victim to the hope that we may soon have indirect but complete control of trichinosis, obtained through laws passed to control vesicular exanthem. It may turn out that fairly good control of vesicular exanthem will be found to be economically feasible, but fairly good control, through fairly good enforcement, may not by any means serve to remove the threat of trichinosis. Also, a way to immunize swine against vesicular exanthem may yet be found, and, in that case, some of the state acts forbidding the feeding of raw garbage might be repealed, since they are concerned with swine welfare and economics, rather than with public health.

## GARBAGE DISPOSAL PROBLEM

With the recent widespread adoption of acts forbidding raw-garbage feeding, a great many municipalities are faced with the problem of garbage disposal, or with the broader problem of refuse disposal. In many communities and perhaps in most, the sanitary landfill method of disposal is the method of choice. When a suitable site can be found within 5 miles, or at most 10 miles, the landfill method appears to be cheaper than incineration. In view of the tight budgeting situation prevailing in nearly all municipalities, the matter of lowest cost not only is of interest but is of paramount importance. Thus, since we now know how to select sanitary landfill sites, and we know how to equip them and operate them, and since the landfill method usually offers the lowest in costs, why may we not expect a very rapid adoption of the method? To gain some insight, let us turn for a moment to the annexation problem. The future for annexation is similar to or identical with the future for the sanitary landfill, in some important aspects.

In the January, 1954, issue of the *Michigan Municipal Review,* one finds the informative article "Municipal Annexation of Territory—a Comparison of Principal Methods" by Prof. William O. Winter. Winter shows that in Missouri and Texas unilateral determination prevails; that is, the city can go ahead and annex, subject always to court review; in Virginia there is a judicial determination; in Georgia and a few other states special acts of the legislature determine annexations; but in the great majority, there is, as he calls it, the Michigan plan,—annexation by bilateral determination. Thus, in a majority of states, those living in fringe areas may reject annexation by voting against it. Thus it is that a majority of our growing municipalities have been quite unable to pursue a sound annexation policy. Fringe areas are no longer rolling farm lands almost empty of people except for those living in a few farmhouses. People have moved out of the city to escape taxes, or they have moved out of one city and up to but not within another city. They want the many benefits obtained by living close to cities, but they do not want to share in paying the bills.

Thus it is that any number of cities are hamstrung as to annexation. Early in this paper, we mentioned that the legislators were falling over each other in their haste to conserve the farmer's pocketbook. But as to annexation, we see no legislators falling over each other in their hurry to come to the rescue of municipalities that are in a bad way. Rural rather than urban forces dominate most of our legislatures, and that is a major political fact.

There is an old story about the pioneering days of the West. A little church, the first in the community, was erected. Then a saloon was opened in the same block. Next, someone found that a city ordinance required that saloons could not be within 500 ft. of a church. The city fathers then generously allowed the church three months in which to move. The modern version of this took place recently, at Detroit. Detroit has been trying to find a site for a new airport. One was finally found in a nearby area. The persons in the area appealed to the state legislature, which promptly passed an act. By it, the airport problem, like annexation, was also reduced to bilateral action: Detroit could have that airport provided the county con-

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Read before the Second National Conference on Trichinosis, Chicago, March 1, 1954.

cerned also would vote for it. This ended the matter, as far as that site was concerned. If a parallel could be drawn, we might almost predict that if municipalities call on the legislatures for help in locating and using reasonable sanitary landfill sites, the cities might be told to stop producing refuse.

The city of Ann Arbor, where I have served on the Common Council for 14 years, has been looking for a landfill site for a decade. We can find the sites, but we cannot use them. Persons in the area of a proposed site refuse to believe that a landfill can be operated so that it is not a nuisance, and they are not interested in being convinced. The extreme of absurdity was reached recently, when some persons objected because refuse trucks would be going up the highway past their homes, on the way to a proposed site. If these same persons ever lived in town, it would be logical to assume that although they would insist on having their garbage collected, they would not allow the truck to stand at the curb while the collection was being made. Actually Ann Arbor's garbage is now disposed of by landfill on a farm; whereas this garbage was, until very recently, fed to swine on this same farm. Let no man take credit for this reform; the credit all goes to vesicular exanthem, which struck the hog farm twice. The farm was finally condemned for swine-raising purposes, and the farmer made a new contract with the city, whereby he continues to take garbage and disposes of it, at a price, by landfill on the same farm. However, it is a haul of 11 miles to the site, with costs borne by the city; and the township has now zoned against this use. If the operation were to cease, there would be no place for disposal. This is why I, soon after the First National Conference on Trichinosis, brought in an amendment to an ordinance that passed, whereby Ann Arbor can operate a landfill in any zone in the city if necessary. This would be an emergency measure, and let us hope it will not be needed. The space available would serve for only a few years.

What is needed by a great many municipalities is new legislation, enabling them to operate sanitary landfills within economical distances, located on suitable soils, and with sites selected with reasonable regard for human occupancy of the areas involved, always subject to court review if necessary; but so that if a project is reasonable in all respects, it can be started without too much fear that it will be stopped.

The present conference can serve a valuable function in defining the problem, but the conference itself, or any committee arising from it, can do little to accomplish the objectives. Any one city can also do little. The one organization that is in a strong position to fight the battle for the municipalities, as to make sanitary landfills feasible, or as to enable annexation, or as to help solve many other pressing problems of the towns and cities, is the American Municipal Association, together with the Municipal leagues in the various states.

Even at best, progress along such lines comes slowly and with difficulty. In the next few years, many a city may find it must give up its dream of having a landfill, and turn to incineration or other means of disposal. And I now note, with some reluctance, that an excellent new publication, entitled "Refuse Collection and Disposal for the Small Community," [1] does a fine job of describing sanitary landfill operations; but it devotes only one page to incineration and says, "This manual does not intend to recommend or promote any type or make of refuse incinerator."

Small communities presumably cannot afford to pay the costs of incineration, which may account for this manual's lack of incinerator information. There is not now any coverage of incinerator methods and costs, equivalent to what this manual furnishes on landfill data. But I am assured by an official of the American Public Works Association that such a manual on incineration is planned and will eventually be made available.

From the technical and economic standpoints, the case for the sanitary landfill is so well established that from these considerations alone, a bright future could be predicted. But from the political standpoint, the outlook is not good. A grant to the municipalities of the needed extraterritorial rights will come reluctantly. Somewhat similar extraterritorial rights for solving the annexation problems will come equally reluctantly. Progress along either line will be slow. A major change in political policy is involved. The basic question is this: shall we, for the good of the whole, give a city extraterritorial rights, under which (always subject to court review) it may extend its limits or do things outside of its limits, without the consent of those affected? This is a big question; and even though it is a pressing one, it is not going to be settled in a hurry. Meantime, it can be predicted that many cities will have to forego the idea of using a landfill and resort to other and more costly means of disposal. One must reluctantly conclude that, whereas the sanitary landfill has large potentialities for helping to control trichinosis and other diseases, political factors will keep those potentialities from being fully realized for quite some time to come.

1. Refuse Collection and Disposal for the Small Community, United States Department of Health, Education, and Welfare and American Public Works Association, Chicago, 1953.

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**Death by Drowning.**—Accidental drownings account for more than 6,500 deaths annually in the United States, or a rate of about 4 per 100,000 population. An increase in the loss of life in small boat accidents has hindered progress in reducing the death rate from drownings since the close of World War II. The limited gains that have been achieved reflect decreases in other types of drowning—those associated with swimming and wading, falls from docks and piers, and similar activities. These types of mishaps not involving water transportation still account for about four fifths of all accidental drownings. A sizable number of drownings occur in every season of the year, but the toll is heaviest in the summer, when outdoor recreational activities are at their peak. Nearly two fifths of all the drownings in our country each year occur in June and July. . . . Most victims of drowning are males . . . the death rate from accidental drowning among males in 1949-1950 was more than six times that among females, the rates being 7.7 and 1.2 per 100,000 respectively, at all ages combined. The greater spirit for venture among males undoubtedly accounts for their much larger loss of life at every age. The highest death rate from drowning—12.5 per 100,000—was recorded for boys 15-19 years of age, but the rates were also relatively high at the adjacent age groups, 10-14 and 20-24. The mortality falls off somewhat with advance in age, suggesting decreased participation in water sports and the development of more cautious behavior.—How and When Drownings Occur, *Statistical Bulletin Metropolitan Life Insurance Company*, May, 1954.

# CONTROL OF TRICHINOSIS AS A PUBLIC HEALTH MEASURE

*Herman N. Bundesen, M.D., Chicago*

Trichinosis is one of the most serious of the parasitic diseases of man and animals. It is a disease that, although it does appear in public health statistics, receives only minor consideration from some few public health officers and but little more from many others. While tests made at autopsy indicate that 16% of the pork-eating population of the United States may have some trichina infestation, the public health statistics show there are few reported diagnosed cases and fewer reported deaths ascribed to trichinosis. Furthermore, little is known of the effect on the health of the human host in some of these infestations that do not produce typical or clear-cut diagnostic symptoms of trichinosis. What is known is that at least in the United States those cases that have been traced back to their source are generally due to the consumption of raw or inadequately cooked pork.

The public health officer with medical training realizes that no person can carry around from an estimated 10 to 1,000 trichina cysts per gram of some of his muscle tissue and not have some illness as a result. Based on the number of positive findings in the deaths in which autopsies have been done, it should be recognized that there must be many more cases of this disease than are actually reported or recorded.

## EDUCATION OF THE PUBLIC

When a case or a series of cases are reported, the health officer must of necessity take any available preventive action in the way of education and proper meat inspection. In some instances, even if the health officer is doing everything he can to instruct the public and protect its meat supply, trichinosis may still appear in his community. For example, one such group of cases occurred in Chicago some years ago. A truck driver, collecting inedible refuse for one of the city rendering establishments, picked up a dead pig in the course of collecting refuse in a rural section of Chicago. Before returning to the rendering plant, the driver stopped his truck in the alley in the rear of a restaurant on the south side of the city, and in order to load the refuse at the restaurant, the driver took the dead pig off the truck and placed it in the alley. When he drove away, he forgot to return the pig to the truck. A short time later, a city street cleaner came along and found the dead pig. He decided that the pig looked good; he put it on his pushcart and at the end of the day took it home. In his homeland in Europe, he had learned of a so-called method that he was led to believe would determine whether meat was fit for food. It was a simple test—all he had to do was to cook the liver and eat some of it; if it didn't make him sick, the carcass was good to eat. He did not get sick, and consequently in his estimation the pig was good to eat. Later that night he made sausage. The next day the family ate plenty of sausage, cooked and raw. Later that evening, the board of health was notified that the street cleaner's entire family was sick. Some of the family died from trichinosis. Here was a case of wanton ignorance and carelessness on the part of the father that led to deaths from trichinosis.

Another unusual incident in Chicago was that of a husband who purchased inspected pork and prepared some homemade sausage. That night, he and his wife and the neighbor's wife ate the sausage raw. The two women became ill from trichinosis. This man had exercised care to buy inspected meat but did not know there was no inspection for trichinae.

These cases are cited to show that prevention of trichinosis may be a difficult matter for the health officer. Prevention and control of trichinosis must be attempted on a national scale, as well as on the local plane. Since ignorance or carelessness on the part of the person who eats raw pork can, at least in part, be corrected by education, there should be a new concept of how to educate the public with reference to trichinosis and other diseases borne in food.

The occasional newspaper article by the local health officer or the pamphlets distributed by the state or federal governments, good as they are, are not adequate. The time to educate the public is when the brain is most receptive. The prevention of trichinosis and other food-borne diseases should be taught to children in the lower grades of the grammar schools. As teaching aids, pamphlets (preferably illustrated with cartoons) that will hold the child's attention should be available. I am sure that, if this is done, the danger of eating raw pork could be impressed on the child for life in most instances.

Education of the public is a part of the control problem. Man gets the disease from an infected hog. When we become sincere and alert enough in our efforts to stamp out trichinosis in man, we will use every means at our disposal to stamp out the disease in the hog. Elimination of infection in hogs will mean elimination of infection in man. For a long time after trichinae had been identified in pork, there was no knowledge as to how the hog became infected. However, in 1874, a German worker named Focke called attention to the large amount of offal from the slaughter house fed to the hogs and stated that this might be the means of spreading the disease from hog to hog. Many authorities did not agree with him, but it is known now that he was very close to the present thought that pork from an infected hog is the commonest means of transmission to other hogs.

## MEASURES OF CONTROL

In 1878, the Chicago Board of Health reported that an examination of 100 hogs in Chicago for the presence of trichinae had revealed positive findings in 8 of them. In 1880, Dr. W. C. Glazier of the U. S. Public Health Service, in an effort to evaluate the feeding of hog offal in the spread of the disease, wrote to the Chicago Board of Health, asking if slaughter-house offal was being fed in Chicago. He was advised that such offal from all large establishments was worked up into fertilizer, but that

President, Chicago Board of Health.

Read before the Second National Conference on Trichinosis, Chicago, March 1, 1954.

some slaughter houses were shipping offal out of town for hog food. I am citing this to show that in Chicago, as long as 75 years ago, trichinosis was receiving some sort of attention. But not enough was done about it. After 75 years of seeking to prevent the spread of this disease, if muscle examinations at autopsy are accepted as diagnostic, the evidence is that there is still more trichinosis in the United States than anywhere else on earth. This is the only disease in which so little preventive progress has been made even though the cause and methods of prevention are known.

Mark, in 1889, pointed out the importance of garbage and offal feeding in the spread of hog trichinosis. Even in the period 1936-1940, the U. S. Public Health Service announced that the studies made by their experts indicated that almost 16% of the pork-eating population might have some trichina infestation. Nevertheless, little, if anything, was done to stop the feeding of raw garbage. Trichinosis in hogs did not seem to present any economic loss to producers, and garbage was the cheapest form of food available for hogs. Not so many cases even now are diagnosed. It is estimated that one of every six persons eating pork may be infected to some degree, because they are careless enough to eat raw or insufficiently cooked pork. By September, 1953 (15 months after a disease known as vesicular exanthem was reported outside of California), 41 states had enacted laws requiring all garbage fed to hogs to be cooked. This was an important step in trichinosis control, even though the legislation was directed at another disease.

When a garbage-cooking law is passed, it does not necessarily mean that all garbage will be cooked properly. In Chicago, there has been some experience in having garbage cooked in one of the institutions (prior to feeding it to hogs). It was found that, with an open kettle fired with a coal fire beneath it, frequently four to five hours were required to bring the garbage cooking temperature up to 165 F. This was especially true on cold winter days. If laws providing for the cooking of garbage are to be enforced, an adequate inspection force is necessary to see that the provisions of the law are carried out.

It is reported that 23 states have set up inspection facilities as of September, 1953. Development of proper cooking technique will take considerable time just as it has taken years to bring about effective pasteurization of milk. In the meantime, hogs infected with trichinae will continue to be slaughtered for food, come what may.

Federal meat inspectors require that all meats containing pork (in whole or in part) that are eaten without further cooking shall be treated by heating, freezing, or drying in order to kill trichinae. However, not all meat is processed under federal inspection. In these instances local control becomes necessary. Each local health officer should instruct meat processors how to process pork in order to assure the destruction of trichinae in all pork products customarily eaten without further cooking. Regulations requiring such treatment of pork should be passed and enforced. In this connection, gamma irradiation of pork holds forth much promise. Gould and his associates have stated that "gamma irradiation of pork is analogous to pasteurization of milk; it is not a substitute for sanitation but it guarantees protection to the consumer should sanitation be defective." The method is simple, effective, and rapid, requiring only about one and three-fourths minutes. It should eliminate fear of trichinosis. The flavor of the meat is not changed by the process. The method described by Gould and his colleagues is relatively inexpensive, particularly for larger and more centralized plants.[1]

It has been many years since the Federal Meat Inspection Service has made routine tests for trichinae in pork, and then these tests were made only on pork for export to those countries that demanded such tests. This inspection should be renewed, not for the purpose of condemnation of such infected hogs, but rather as a spot inspection to determine the source of infected shipments.

Laws could be passed for the prosecution of the guilty producer. Even a very small fine for the first offenders would help spotlight the necessity for better sanitation in hog production. Only in this way can careless and greedy producers be made to understand the gravity of their offense against public health. Briefly then, for better control of trichinosis in man, it is recommended that there be: (1) continuous education of the public, starting now, in the lower grades of schools; (2) education of swine producers in livestock sanitation and disease prevention; (3) extension of laws requiring cooking (under supervision) of all garbage that is fed to hogs, to embrace all states and also the adoption of a rigid system of inspection to insure the carrying out of such laws; (4) country-wide adoption of the valuable federal regulations for processing of pork commonly consumed without further cooking, so that processors not under federal inspection will be compelled to treat such pork in a way to make it safe; and (5) passage of a law making the producer liable for shipment (into any stockyard or slaughter plant) of trichina-infected hogs. To make such laws workable, a spot inspection should be set up to identify trichinous animals. There must be enforcement by the health officer of regulations that will protect the consumer from faulty cooking in public eating places, thus assuring well-cooked pork in all places, at all times, for all persons.

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1. Gomberg, H. J.; Gould, S. E.; Nehemias, J. V., and Brownell, L. E.: Design of a Pork Irradiation Facility Using Gamma Rays to Break the Trichinosis Cycle, Ann Arbor, Mich., University of Michigan, Feb. 1954.

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**St. Luke the Physician.**—From what we can learn Luke was Paul's physician as well as his friend. We know that he accompanied the apostle on several of his journeys. It is thought that he practised in Antioch or Tarsus and there met Paul. Adolph Von Harnack, the great German theologian, made a special study of "Luke the Physician," and his conclusions were that Luke was trained in Greek medicine. . . . Doctors with a love of reading and writing should have a special attachment for St. Luke, the quality of whose literary work has been recognized down the ages. . . . Ernest Renan, the French scholar, critic and author, wrote of St. Luke's gospel as follows: "It was a beautiful soul from which came the most beautiful book ever written." He further states that he (Luke) was a "religio medici" in his pity for frail and suffering humanity, and in its (the gospel of Luke's) sympathy with the triumph of the "Divine Healing Art" over the souls and bodies of men. Some believe that St. Luke was also a painter. Certainly he has proved the inspiration for much painting as well as poetry and music.—Physicians Devoted to Patron Saint, Luke, *The Canadian Doctor*, October, 1953.

# CONTROL OF TRICHINOSIS BY REFRIGERATION OF PORK

*Willard H. Wright, Ph.D., Bethesda, Md.*

At the First National Conference on Trichinosis, refrigeration of pork was reviewed by Miller (1952)[1] in relation to the federal meat inspection regulations and by Augustine (1952)[2] as regards quick-freezing for the destruction of the larvae of Trichinella spiralis in pork. There have been no changes in the past year in requirements of the federal meat inspection regulations concerning the freezing of pork or pork products customarily eaten without cooking by the consumer. For pieces not exceeding 6 in. (15.2 cm.) in thickness or stored in crates not exceeding 6 in. in depth, the holding time prescribed is 20 days at 5 F, 10 days at –10 F, or 6 days at –20 F. For products in layers or containers exceeding 6 in. in thickness or depth but not exceeding 27 in. (68.6 cm.), the holding times at the above-prescribed temperatures are respectively, 30, 20, and 12 days. The safety factor provided by these regulations has been amply confirmed in years past and more recently by Harrington, Spindler, and Hill (1950).[3]

Several investigators have conducted limited studies on the fate of Trichinella larvae in quick-frozen pork. Augustine (1933)[4] found that quick-freezing at –15 C (5 F) for three hours killed Trichinella larvae, whereas slow-freezing at this temperature required 42 hours for destruction; in both instances the meat was held at –15 C for an additional 48 hours. Augustine (1952)[2] stated that pork can be made safe against trichinosis (1) by lowering the temperature immediately to –35 C (–31 F) or (2) by lowering the temperature first to –18 C (–0.4 F) with subsequent storage for three days at the same temperature. Blair and Lang (1934)[5] found that quick-freezing for three to four hours at –17.8 C (0 F) with continued holding at this temperature for a minimum of 53 hours apparently destroyed Trichinella larvae in pork roasts.

Gould and Kaasa (1949)[6] conducted more extensive experiments with quick-freezing. Trichinella larvae were destroyed after exposure of infected pork to the following temperatures for the periods stated:

| Freezing Temperatures | | |
|---|---|---|
| F | C | Freezing Time |
| — 16.6 | — 27 | 36 hours |
| — 22 | — 30 | 24 hours |
| — 27.4 | — 33 | 10 hours |
| — 31 | — 35 | 40 minutes |
| — 34.6 | — 37 | 2 minutes |

Gould (1945)[7] has recommended that all pork produced in the United States be processed for the destruction of trichinae. The New York Academy of Medicine (1948)[8] expressed the view that more fundamental research should be conducted on the potentialities of quick-freezing in this regard. Unless there are available data of which the writer is unaware, the last recommendation would still seem to be a pertinent one. Investigations to date have dealt only with the quick-freezing of small pork cuts, none weighing over approximately 1,800 gm. (4 lb.). The results would certainly not be applicable to the quick-freezing of hog carcasses and probably not applicable to the larger cuts commonly handled in packing-house procedure. Information is needed concerning the minimum temperature and holding time required to provide a safe margin for hog carcasses and large cuts, as well as for pork cuts packed in boxes, tierces, cartons, or other containers commonly used by the trade.

Before any sensible recommendation can be made for the freezing of all pork (by any method) for the control of trichinosis, not only should we be in possession of the essential technical data, but we should give some consideration to the amount of freezing capacity available and the costs involved. Recommendations concerning quick-freezing must also take into consideration changes induced in the product and consumer taste.

At the time the New York Academy of Medicine was considering the trichinosis problem, it sought advice from the American Society of Refrigerating Engineers. The society's technical committee on meat packing, of which J. P. McShane of Swift and Company was chairman, estimated that it would require the equivalent of all the freezer capacity available at that time to process all of the pork produced yearly in the United States. I have the figures (1943 basis) used by that committee in reaching such a conclusion, but I should like to bring them up to date.

According to the U. S. Department of Agriculture (1952),[9] there was in the United States on Oct. 1, 1951 (1953 survey data have not yet been made available), a total of 212,710,000 cu. ft. of sharp-freezer space and 91,520,000 cu. ft. of freezer space, or a grand total of 304,230,000 cu. ft. (Sharp-freezer space is defined as

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Read before the Second National Conference on Trichinosis, Chicago, March 1, 1954.

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1. Miller, A. R.: The Control of Trichinosis Through Federal Meat Inspection, Proceedings of the First National Conference on Trichinosis, distributed by Veterinary Public Health Section, Epidemiology Branch, Communicable Disease Center, Public Health Service, Atlanta, Ga., 1952, pp. 41-44.

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3. Harrington, R. F.; Spindler, L. A., and Hill, C. H.: Freedom from Viable Trichinae of Pork Products Prepared to be Eaten Without Cooking Under Federal Meat Inspection, Proc. Helminthol. Soc. Washington **17**: 90-91 (July) 1950.

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8. Control of Trichinosis, report by the Committee on Public Health Relations, New York Academy of Medicine, Pub. Health Rep. **63**: 478-488 (April 9) 1948.

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that capable of being held at 0 F and below. Freezer space is defined as that capable of being held at a temperature above 0 F to 29 F.)

In 1943, there was available in the United States total sharp-freezer capacity of 110,718,000 cu. ft., an amount that the technical committee estimated would be required to freeze and hold all pork produced in the United States in accordance with the requirements of the Bureau of Animal Industry. While sharp-freezer space almost doubled between 1943 and 1951, most of this gain represented additional space in refrigerated warehouses and not in meat-packing plants. On Oct. 1, 1951, in meat-packing plants there was available sharp-freezer space of only 14,180,000 cu. ft. Freezer space then totaled 17,737,000 cu. ft. or a total of 31,917,000 cu. ft. The average number of hogs slaughtered under federal meat inspection during the last seven years was 55,006,300. The average total slaughter in the United States during the past seven years was 76,340,229. Yearly pork production during this time has been roughly 11 billion pounds.

It would seem obvious that meat-packing plants do not have available at this time sufficient freezing capacity to handle all pork produced in the United States or even that produced under federal meat inspection. To provide sufficient capacity would require a heavy investment of capital. Even if such capacity were available, there are other factors to be considered in connection with any recommendation that all pork be frozen. These concern changes in plant arrangement, packing, handling, and shipping, changes that would increase the cost of marketing the product. Williams (1944)[10] estimated that it would cost 3 cents more a pound to market frozen pork chops over fresh chops. Since that time, the cost must have doubled. Not only is the consumer's dollar involved but also the consumer's taste. Some persons object to the "drip" and color of frozen pork.

Norman Draper, director of the Department of Public Relations, American Meat Institute, has furnished certain data concerning the cost of quick-freezing pork and consumer reaction to the frozen product. In the Chicago area, the charge for quick-freezing is 18 cents per 100 lb., and the warehousing charge is 60 cents to 70 cents per 100 lb. per month. The American Meat Institute estimates that the operating cost for quick-freezing pork is approximately 5 cents per pound without reference to the capital cost. According to this authority, the amount of quick-frozen pork now marketed in the United States may be described as negligible. Also, changes in the product after quick-freezing have been a troublesome factor and have contributed to consumer resistance.

In spite of what has been reported above, there is an encouraging note to the freezing situation. In addition to the total capacity figures given above for warehouse refrigeration, there are some 30 million cubic feet of sharp-freeze facilities in locker plants and 70 million to 80 million cubic feet in home freezers. Pork is stored in many of these facilities. While little or no attention is paid to temperature-holding requirements from the standpoint of trichinosis, yet, no doubt, much pork is held in these facilities at temperatures and for a time sufficient to destroy trichina larvae. For this reason, such facilities contribute to the control of the disease.

## SUMMARY AND CONCLUSIONS

The value of refrigeration for the destruction of larvae of Trichinella spiralis in pork and pork products has been amply demonstrated by the experiences under the federal meat inspection regulations, which require special treatment of products destined for consumption without cooking by the consumer. While of undoubted value, quick-freezing methods have not been adequately formulated, and additional technical data are needed before intelligent recommendations can be made for the general application of this method in the control of trichinosis. Present sharp-freezing capacity available in meat-packing plants is not sufficient for the quick-freezing of all pork produced in the United States. Additional facilities would require heavy financial outlays for new equipment and plant rearrangement. Product changes that follow quick-freezing and consumer taste are additional factors that must be considered. While of an unsupervised nature, storage of pork in food lockers and home freezers has probably contributed toward the control of the disease.

10. Williams, E. W.: Meat—Its Future as a Quick Frozen Product, Quick Frozen Foods **7**: 34-37, 75, 80, 1944.

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*Following are the recommendations adopted by the 1952 National Conference on Trichinosis. Amendments of the 1954 Conference, held in Chicago, March 1, 1954, appear in brackets.*

### I. PUBLIC HEALTH

Trichinosis is a preventable disease of public health significance for which known methods of control are available. Public health organizations should encourage, support and cooperate with animal disease control agencies in efforts directed toward the ultimate eradication of trichinosis. Control measures against trichinosis are also effective against other diseases of swine transmissible to man.

The following research should be encouraged:

1. Effect of ionizing irradiation on trichinae in hog carcasses.
2. Specific diagnostic tests for trichinosis in man and swine.
3. Alternate methods of garbage disposal.
4. Standardization of garbage-processing methods, including development of equipment with time and temperature studies.
5. [Role of rats and other animals in the transmission of trichinosis.]

[Much remains to be learned regarding trichinosis and its scope, and legislatures should be asked for funds for the study and control of this disease. Nevertheless, it is not necessary to postpone vigorous action toward control and possible eradication of trichinosis.]

Public health education should be accelerated in order to (1) emphasize to the public and to physicians the hazards of contracting trichinosis, and (2) disseminate all existing information on methods of control of trichinosis, including alternate methods of garbage control. Such information should be consolidated in one publication.

It is recommended that the feeding of raw animal offal to swine be prohibited; that all garbage to be fed to hogs shall be adequately heat-treated; that States be encouraged to adopt uniform garbage-cooking regulations; that the U. S. Public Health Service Interstate Quarantine Regulations relating to raw garbage be enforced; and that these recommendations be brought to the attention of the Council of State Governments.

It is recommended that the Bureau of Animal Industry prohibit interstate shipment of all raw pork from swine that have been fed raw garbage.

[The American Medical Association and the Conference of State and Territorial Health Officers are urged to adopt measures to stimulate better reporting of cases of human trichinosis in all areas of the United States.]

[Cooperation should be stimulated between State and local Health Departments, Departments of Agriculture and Livestock Sanitary Commissions and corresponding Federal agencies in obtaining enforcement of existing laws requiring the cooking of garbage that is to be fed to hogs. While all but 7 States now have laws or regulations, enforcement of these laws or regulations at present is inadequate.]

[Because of the advantages of having up-to-date information concerning the incidence of trichinosis in man, and in view of a decreased incidence of trichinous infection encountered in swine, the United States Public Health Service is requested to repeat the random survey of human trichinosis carried out by that agency between 1936 and 1941.]

## II. ANIMAL HEALTH

Swine diseases that are garbage-borne include hog cholera, vesicular exanthema, foot-and-mouth disease, salmonellosis, tuberculosis and trichinosis. Other diseases including brucellosis, anthrax and pork tapeworm may also be transmitted by ingestion of contaminated flesh. Adequate cooking of garbage would control the route of garbage transmission of these diseases.

It is recommended that the respective states allow the sale of garbage-fed hogs for slaughter only at a federally inspected plant or plant having equivalent inspection.*

It is further recommended that no indemnity be paid for losses from animal diseases at piggeries where raw garbage is fed.† It is emphasized that most important in the problem of swine diseases that are garbage-borne are the animal vesicular diseases and hog cholera.

It is urged that research be initiated on the advantages of feeding cooked garbage in comparison to feeding with raw garbage, with particular reference to its nutrient qualities and the control of communicable diseases.‡

It is suggested that studies be made on means of identification of garbage-fed hogs, such as ear-tattooing.

[The Conference reiterates its 1952 statement in urging all States to adopt regulations requiring the cooking of garbage and offal that is to be fed to hogs, with the exception of States that may wish to prohibit the feeding of any garbage.]

[States that have adopted laws relating to the cooking of garbage, before granting licenses to cook garbage, should require all piggeries to have approved cooking equipment which shall be demonstrated by the piggeries to be efficient. Licensure should be granted annually and should be dependent on compliance with sanitary regulations. The location and operation of all piggeries should comply with all local and State public health laws, and all piggeries should be subject to public health inspections regarding health matters, including control of rodents, flies, drainage, odors and noise.]

[State Colleges are urged to give short courses for garbage feeders to demonstrate standards of construction, operations and maintenance of equipment and facilities. These courses should acquaint farmers with the dangers of feeding raw garbage and the benefits to be derived from feeding cooked garbage and offal. It is also urged that conferences be held with County Agents to acquaint them with the principles of garbage feeding and with its dangers and benefits.]

[The Federal government is urged to require that all garbage removed from Federal installations be cooked adequately before being fed to hogs.]

[The Conference recommends the prohibition of any type of garbage feeding in those States or areas of the country in which garbage feeding has not been made a general practice.]

[Research on animal serology should be pursued in an effort to obtain an adequate diagnostic method for trichinosis.]

[A study of the garbage-feeding laws of various States should be made by the Continuing Committee on Trichinosis.]

## III. LEGISLATION

The National Conference on Trichinosis resolves to encourage its members and their organizations to do everything possible to promote and obtain the enactment and enforcement, in each of the 48 states and territories, of laws and/or regulations [requiring that all garbage or kitchen waste be treated by heating, at least to 212° F for 30 minutes, before it is fed to swine, or should adopt some other measure that will be equally effective in the control of livestock disease and thereby protect public health. State legislation relative to the cooking of garbage fed to hogs should be strictly enforced with an adequate staff of field and administrative personnel.]

It is recommended that the member organizations of this Conference and the Federal Government study the possibility of implementing by Jan. 1, 1955, federal quarantine on a statewide basis, and of refusal to allow live hogs or raw pork to move out of any state which shall not have and enforce a-regulation requiring the cooking of hog-feed garbage and offal at licensed cooking establishments where adequate mechanical controls are maintained.

[All States that have not already done so, should enact laws, patterned after the regulations of the Meat Inspection Services of the U. S. Department of Agriculture, which will require meat processors to carry out proper processing procedures in the manufacture of pork products customarily eaten without cooking.]

[Legislation should be enacted by the States and/or municipalities defining "hamburger," "ground beef," and similar comminuted meat products to prohibit the inclusion of any quantity of pork in such products.]

[Legislation should be enacted requiring every retail store selling pork or pork products to post one or more signs reading, "Cook pork thoroughly" or bearing equivalent language.]

[Legislation should be enacted prohibiting the grinding or comminuting of pork in the same equipment used for comminuting beef, lamb or other meats.]

## IV. EDUCATION

It is recognized that educational measures are an essential part of a trichinosis-control program.

It is recommended that educational measures should be further developed and extended into the following areas:

1. Where garbage is fed commercially to swine, disinfection of garbage and adoption of other sanitary measures should be promoted.

2. Continuation of the program of informing housewives and other food handlers on the necessity of cooking all pork and pork products thoroughly.

3. Increased efforts toward improvement of diagnostic procedures to reveal the number of infections in man and hogs, such as making available antigen for the rapid flocculation test in Health Department and other laboratories.

4. Since most control of garbage feeding is directed toward the commercial feeder, a program is necessary to persuade the farmer, feeding his own household garbage to swine for his own use, to separate all raw pork scraps and offal from his swine feed.

5. Greater dissemination to communities of available information on other methods of garbage disposal.

The proceedings of this Conference shall be duplicated and distributed for informational purposes to agencies and individuals represented at this Conference and to other organizations having an interest related to this problem.

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* This recommendation has been adopted by the federal government.

† This recommendation has been adopted by the federal government and most states.

‡ Such research has been undertaken at Iowa State College, the University of California, and the Los Angeles Livestock Sanitary Board.

[Efforts should be made to reach additional target audiences in broad and new areas in the general population, including school children, homemakers, organizations and groups of men, women's clubs, women's publications, magazines and trade publications, church groups, restaurant operators, and cooks and other food handlers, especially in small restaurants, restaurant systems and cooking schools.]

[It is urged that booklets of instruction on proper cooking of pork be issued with licenses to food handlers and restaurants, and be distributed also by food inspectors of local health departments. In this program, cooperation should be sought from the National Restaurant Association, hotel associations and caterers' associations.]

[It is recommended that an article be prepared for *Today's Health*, a publication of the American Medical Association, on the proper handling and preparation of pork, and that reprints be made available at cost, through the help of the Association of State and Territorial Health Officers, the U. S. Public Health Service, and local health departments.]

[Placards for butcher shops, reading "Cook pork thoroughly," should be prepared and distributed by U. S. Public Health Service, U. S. Department of Agriculture and/or State Health Departments.]

[It is urged that the Health Education Section of the American Public Health Association and the Association of State and Territorial Health Officers, inform local health officers regarding their responsibilities in control of trichinosis.]

[The Conference urges its Sponsors and the Continuing Committee to concentrate their efforts on the methods and types of education that seem hopeful of realization.]

[County Agents and Extension Workers are urged to continue to instruct, and intensify their efforts in persuading individual farmers to exclude raw pork scraps and offal from the feed of swine.]

### V. RESEARCH

[*Wildlife Survey.*—Inasmuch as the sylvatic occurrence of *Trichinella spiralis* probably plays an important role in the life history of this parasite, it is highly desirable to obtain information concerning instances of trichinosis in wild animals, including the rat. It is recommended that an appeal be made to organizations and groups of workers who are accustomed to examine wild animals, including the U. S. Fish and Wildlife Service, various biologic survey groups, the American Society of Parasitologists and the American Society of Mammologists, and through these agencies to their members, to examine, wherever possible, any wild animals and to report their findings to the Continuing Committee on Trichinosis. Proper techniques of direct compression and digestion methods of examination of muscle tissue should be made available to these various groups.]

[*Cost of Gamma Irradiation of Pork.*—Investigations on gamma irradiation of pork have now progressed to the point where it is necessary to develop realistic estimates of cost on the commercial use of this process. It is, therefore, recommended that the Atomic Energy Commission be requested to consider the possibility of making an actual cost study of this process in what might be considered a good-sized pilot plant. It is recognized that until some realistic costs are determined that further work in this field will be confined purely to scientific problems.]

[1. In developing these costs it is suggested that attention also be given to the increased shelf-life of meat exposed to irradiation, to the investment for the original plant, and to the cost of operation of such a plant.]

[2. Whereas the observed effects of irradiation on *Trichinella spiralis* may be valid as indicated by experimental feeding of white rats, it is recommended that these studies be extended to determine if the effects are also valid when irradiated trichinous pork is fed to a large animal, such as the hog, and to a primate, such as the common laboratory monkey.]

[3. Whereas present findings indicate that gamma irradiation of trichina larvae reduces the severity of enteritis produced by the worms, it is recommended that a thorough study be conducted on the effect of irradiation of trichinous meat on the enteric phase of the disease.]

[*Immunologic Aspects of Trichinosis.*—It is recommended that the United States Department of Agriculture conduct experiments on immunity, using the hog as the test animal. Inasmuch as immunity in rats to fatal trichinosis can be induced by feeding small doses of non-irradiated larvae, as well as by feeding larvae that have been sexually sterilized by irradiation, studies should be carried out to determine if such immunity can be imparted to hogs and to primates.]

### VI. ORGANIZATION

The Conference authorizes the establishment of a Continuing Committee which shall consist of all the speakers on the 1952 program and a representative of each sponsoring organization. This Continuing Committee shall submit proceedings and resolutions to the sponsoring organizations, receive interim correspondence and arrange for another conference approximately one year from the close of the 1952 Conference.

[The objectives of the Conferences are: 1. To promote the control of human trichinosis with a view toward its eradication in the United States, and 2. To cooperate with organizations and other agencies and groups in programs allied to the control or eradication of trichinosis.]

[The following results have been achieved since the 1952 Conference was held: 1. Regulations or laws requiring the cooking of garbage have been adopted in 41 States. (See reference to vesicular exanthema, in Section II.) 2. The active interest in the control of trichinosis by Public Health organizations and workers has been secured. 3. Representatives of national organizations having widely divergent fields of interest have sat together and discussed mutual problems for the public good. 4. The objectives and the work of the Conference have been sponsored by leading national organizations, and have come to the attention of the American public.]

[The Conference endorses the work of the Continuing Committee and recommends: 1. Maintenance of the Continuing Committee with one representative designated by each sponsoring organization. 2. Determination by the Continuing Committee of methods of financing its organization. 3. The time and place of the next Conference shall be determined by the Continuing Committee after consultation with the Sponsors.]

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**Cholangiography.**—One of the best ways to evaluate the anatomy of the biliary tract is by operative cholangiography. Anomalies, stones, and obstructions due to pancreatitis or to tumors can be visualized clearly. The technic is simple and if properly executed does not add more than five minutes to the operating time. Injuries of the common duct would largely be avoided if cholangiograms were performed routinely before gallbladders were removed. Cholangiography is at least as accurate as exploration in determining the presence or absence of stones. Its routine employment at the time of cholecystectomy saves many needless explorations of the common duct and the attendant increase of morbidity and hospitalization. Cholangiography is not one hundred per cent accurate and a normal appearing cholangiogram should not be interpreted as conclusive evidence that stones are not present. If there are clear-cut indications, such as a history of jaundice or a dilated cystic duct with small stones in the gallbladder, the common duct should be explored regardless of the cholangiogram. The accuracy either of cholangiography alone or of exploration alone may be approximately 90 per cent, but the combination of the two methods increases the accuracy to nearly 100 per cent. Clinical indications of stones should therefore remain as clear indications for both cholangiography and exploration. Cholangiography performed after the common duct has been opened is never as accurate as when it is done through the cystic duct before there is any possibility of air bubbles entering the duct system. Nevertheless, even after exploration, if the duct has been irrigated and barbotaged with water and if all air has been aspirated before the cholangiogram is made, air bubbles do not often cause confusing negative shadows. Certainly in all cases in which multiple stones have been removed, exploration should be followed by cholangiography.— G. Crile Jr., M.D. Errors in Surgery of the Biliary Tract, *Cleveland Clinic Quarterly*, April, 1954.

# SUCCESSFUL RESECTION OF ANEURYSM OF DISTAL AORTIC ARCH AND REPLACEMENT BY GRAFT

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*and*
*Denton A. Cooley, M.D., Houston, Texas*

During the past few years, increasing interest has been aroused in excisional therapy for aneurysms of the aorta. In general, two types of procedures have been developed for this purpose, namely, tangential excision with repair of the resultant defect by lateral aortorrhaphy and resection of the involved segment of aorta with restoration of continuity by aortic homograft.[1] While the former procedure may be employed for sacciform aneurysms located in any part of the aorta, including the arch, there are definite limitations to application of the latter procedure in this respect owing to the potential ischemic effect of temporary arrest of the circulation from cross clamping of the aorta during its performance. Obviously, the more proximal the lesion, the greater is the likelihood of ischemic damage to vital organs from this procedure. Accordingly, this problem assumes particular importance for lesions located about the aortic arch and has, therefore, seriously limited the usefulness of this method of therapy. Indeed, its first successful application in a case of fusiform aneurysm of the descending thoracic aorta was only recently reported.[2] So far as we have been able to determine, there are no reports of its successful application in a case involving a portion of the arch of the aorta. It seems desirable, therefore, to report the following case of a fusiform aneurysm involving the distal portion of the arch of the aorta that was successfully resected with restoration of normal blood flow by means of an aortic homograft. The fact that this was done after hypothermia had been induced is of added interest.

## REPORT OF A CASE

A 31-year-old white man was admitted to the Methodist Hospital, Houston, Texas, on July 5, 1953. In March, 1945, while on active duty in the Air Force, he sustained a severe crushing injury to the chest. This injury was treated by repeated thoracenteses with aspiration of a large amount of blood from the left pleural cavity. He ultimately recovered and was retired in July, 1946, with a diagnosis of "aneurysm of the aorta, nonsyphilitic." Since then he had had no symptoms referable to this lesion but had been aware of its presence on the basis of roentgenographic examinations.

Physical examination revealed a well-developed white man in apparently good general physical condition. The temperature, pulse, and respiration were normal, and the blood pressure was 120/70 mm. Hg in both arms. The heart was not enlarged, and there were no unusual sounds or murmurs. The remainder of the examination disclosed nothing of significance. Laboratory studies revealed 5,400,000 erythrocytes per cubic millimeter, hemoglobin level of 17.5 gm. per 100 cc., and 7,000 leukocytes per cubic millimeter with 70% segmented neutrophils, 2% band forms, 27% lymphocytes, and 2% monocytes. Kahn and Kolmer serologic tests yielded negative reactions for syphilis. Urinalysis showed a slight trace of sugar but no acetone. An electrocardiogram revealed no abnormality. Roentgenographic studies of the chest showed that the heart and lungs were normal, but a large lobulated mass with a peripheral rim of calcification was visible in the upper left mediastinal region projecting into the left pulmonary field (fig. 1). Questionable pulsations in the mass were observed on fluoroscopic examination. On the basis of these findings, a diagnosis of traumatic aneurysm of the aorta was made.

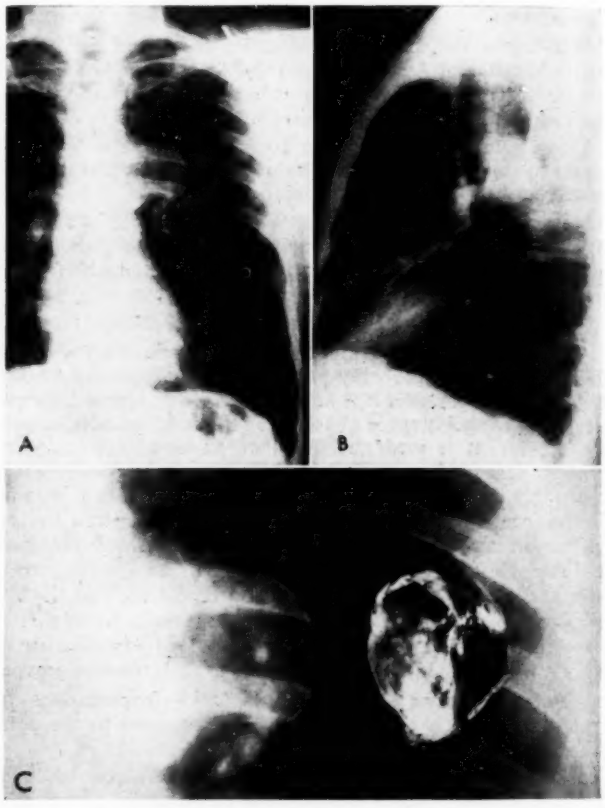


Fig. 1.—*A*, Anteroposterior roentgenogram of chest showing large lobulated mass, with a peripheral rim of calcification, projecting into left pulmonary field from upper left mediastinal region, representing aneurysm of distal portion of aortic arch; *B*, left lateral roentgenogram of chest showing somewhat rounded mass representing sacciform extension of aneurysm of distal portion of aortic arch; and *C*, Anteroposterior roentgenogram of chest with superimposed photograph of excised sacciform aneurysm showing its relationship to roentgenographic view of aneurysm.

The first operation was performed on July 7, 1953. The man was given general anesthesia, with ether and tracheal intubation, and was placed in a right lateral position. The left pleural cavity was entered through the bed of a resected segment of the fifth rib (fig. 2*A*). The lung was retracted forward, and the distal portion of the arch and upper part of the descending thoracic aorta were exposed. A fusiform swelling of the arch could be seen beginning at about the origin of the left subclavian artery and extending distally to involve the entire distal limb of the arch to its junction with the descending thoracic aorta (fig. 2*B*).

From the Department of Surgery, Baylor University College of Medicine, and the Methodist Hospital.

This study was supported in part by a grant from the Houston District Chapter, Texas Heart Association.

1. (*a*) Bahnson, H. T.: Definitive Treatment of Saccular Aneurysms of the Aorta with Excision of Sac and Aortic Suture, Surg., Gynec. & Obst. **96**: 383, 1953. (*b*) Cooley, D. A., and De Bakey, M. E.: Surgical Considerations of Intrathoracic Aneurysms of the Aorta and Great Vessels, Ann. Surg. **135**: 660, 1952. (*c*) De Bakey, M. E., and Cooley, D. A.: Excisional Therapy of Aortic Aneurysms, Am. Surgeon **19**: 603, 1953.

2. De Bakey, M. E., and Cooley, D. A.: Successful Resection of Aneurysm of Thoracic Aorta and Replacement by Graft, J. A. M. A. **152**: 673-676 (June 20) 1953.

Superimposed on this fusiform swelling and arising from its superior and posterolateral surface was a sacciform aneurysm measuring approximately 6 cm. in diameter. An occluding clamp was placed tangentially across the neck of this sacciform aneurysm. The aneurysm was excised distal to the clamp, the defect then being repaired by lateral aortorrhaphy with one row of interrupted mattress sutures and a second row of interrupted figure eight sutures of 000 silk (fig. 2*C* and *D*). The wound was closed in layers after insertion of an intercostal catheter for under-water-sealed drainage.

After an uneventful postoperative course, the patient was discharged from the hospital completely recovered on July 17, 1953. He resumed his normal activities and remained well until early in December, 1953, when he began to complain of some discomfort in the left side of the chest, along with slight hoarseness, dysphagia, and difficult deep breathing. These symptoms became progressively worse, and he was readmitted to the hospital on Jan. 31, 1954.

Examination and laboratory investigations yielded findings essentially similar to those of the previous admission, except for the roentgenographic studies. Fluoroscopic examination of the chest disclosed a pulsating mass extending from the left side of the upper mediastinum, and frontal, lateral, and oblique films showed that this mass had increased in size in comparison with films made after operation (fig. 3). An aortogram made by retrograde injection of 70% sodium acetrizoate (Urokon sodium) into the left common carotid artery clearly demonstrated a bilocular fusiform aneurysm arising at the junction of the transverse and descending portions of the aortic arch (fig. 4).

The second operation was performed on Feb. 5, 1954, after general hypothermia was obtained by wrapping the patient in a rubber blanket containing coils through which a refrigerant solution circulated. By this means the rectal temperature was gradually reduced from 99 to 87 F over a period of 2 hours and 40 minutes. After this the cooling procedure was discontinued and the operation begun. During the 4 hours and 20 minutes required to complete the operation, the rectal temperature dropped to 82 F in the first hour, remained at this level during the next two hours, and was 83 F at the end of the operation. When the operation was concluded, rewarming was begun with heat cradles and the blanket containing the coils through which hot water was circulated. By this means the temperature was restored to normal in about four hours.

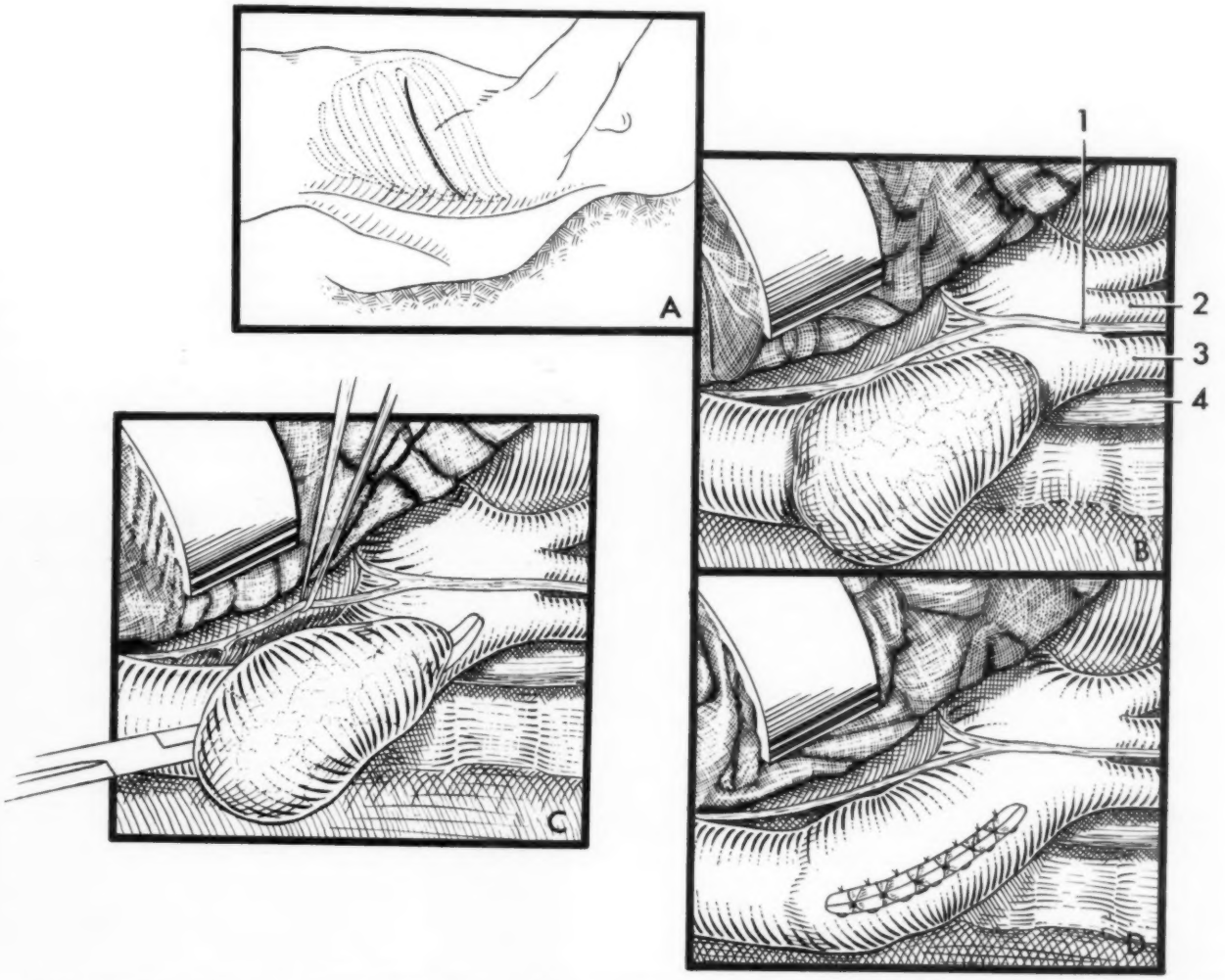


Fig. 2.—Drawing made during first operation showing *A*, left thoracotomy through resected bed of fifth rib; *B*, anatomic relationship of aortic aneurysm; *C*, technique of tangential excision of aneurysm with occluding clamp applied across neck of aneurysm; and *D*, completed procedure of lateral aortorrhaphy (1, vagus nerve; 2, left common carotid artery; 3, left subclavian artery; and 4, esophagus).

The left pleural cavity was entered through the previous incision. The aneurysm was covered anteriorly and superiorly by adherent lung and arose in the aortic arch at a point between the origin of the left common carotid and subclavian arteries (fig. 5*A*). It involved the aortic arch from this point distally to the origin of the descending thoracic aorta and was fusiform and somewhat bilocular in character. By careful dissection the aortic arch proximal to the aneurysm was sufficiently freed from surrounding structures to permit encirclement by means of umbilical tape between the left common carotid and left subclavian arteries. The descending thoracic aorta distal to the aneurysm was similarly prepared. Occluding clamps were then placed across the aortic arch just proximal to the left subclavian, across the descending thoracic aorta just distal to the aneurysm, and across the left subclavian just distal to the aneurysm (fig. 5*B*). The clamp across the aortic arch was applied

slightly obliquely in order to be well proximal to the aneurysm but to permit blood flow into the left common carotid artery (fig. 5*B*). After application of these clamps, the aneurysm was excised and the resultant defect, which measured approximately 9 cm. in length, was bridged with a comparable segment of aortic homograft that had been preserved in a modified Tyrode's solution (fig. 5*C*). The method of anastomosis consisted of the use of a continuous through and through suture of 0000 silk suture (arterial) (fig. 5*D* and *E*). After this was done the clamps

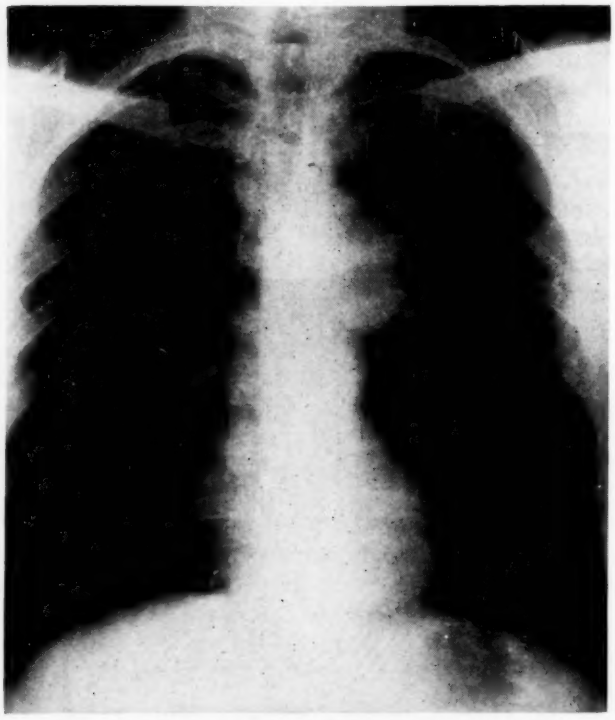

Fig. 3.—Roentgenogram of chest made on readmission to the hospital approximately seven months after the first operation, showing recurrence and increase in size of the aneurysm.

were removed, and good circulation of blood through the graft ensued (fig. 6). The duration of aortic occlusion was 62 minutes. The chest wound was closed in layers after insertion of an intercostal catheter for under-water-sealed drainage. During the operation 2,000 cc. of blood was administered.

At the end of the operation, the patient's condition appeared satisfactory, but during the ensuing few hours the blood pressure gradually dropped to 70 mm. Hg in spite of adequate blood replacement and the administration of a solution of arterenol (nor-epinephrine). It was observed that the chest catheter was blocked, and clinical and roentgenologic evidence of massive hemothorax became apparent. Accordingly, the patient was returned to the operating room, and the left pleural cavity was reentered by opening the wound. A large amount of clotted and fluid blood was evacuated. This bleeding seemed to originate from a general ooze from the region of the aneurysmal bed, the anastomotic sites being intact. A few bleeding points in the thoracic wall were sutured, and the patient was given calcium gluconate and protamine sulfate intravenously with the objective of enhancing the clotting mechanism. Finally, the hemorrhagic ooze appeared to be controlled, and the wound was resutured, after insertion of an anterior and posterior intercostal catheter for under-water-sealed drainage. After completion of this procedure and administration of 3,000 cc. of blood, the patient's condition seemed greatly improved, and the blood pressure was maintained at 120/80 mm. Hg.

In view of the magnitude of the operation, the postoperative course was gratifyingly smooth. For the first few postoperative days, the temperature ranged between 100 and 102 F, but the fever gradually subsided with administration of penicillin, streptomycin, and oxytetracycline (Terramycin), and convalescence thereafter was uneventful. At no time was there any evidence of ischemic damage to the spinal cord or other vital organs. During the first 24 hours after operation, the urinary output was 1,425 cc., and thereafter it ranged between 1,500 and 2,000 cc. The patient was discharged from the hospital in good condition on Feb. 21, 1954.

A follow-up examination on April 2, approximately two months after the second operation, showed that the patient was in good condition, had gained about 15 lb. (6.8 kg.), and had resumed work. A roentgenogram of the chest at this time revealed evidence of slight pleural thickening of the left side of the chest but a relatively normal appearance of the aortic shadow (fig. 7). Another follow-up examination on June 15, 1954, about four and one-half months after the operation, showed the patient to be in excellent condition with a relatively normal chest roentgenogram.

Grossly the specimen removed at the second operation showed, in addition to the fusiform aneurysmal process, multiple, small sacciform aneurysms arising at the site of the previous aneurysmectomy where the lateral aortorrhaphy was performed (fig. 8). Histological examination revealed arteriosclerotic mural changes.

## COMMENT

Of the several interesting features about this case, the one deserving major consideration is concerned with the fact that there was no ischemic damage to the spinal cord or other vital organs after arrest of aortic circulation just distal to the left common carotid artery for one hour. This is particularly significant in view of certain clinical and experimental observations demonstrating

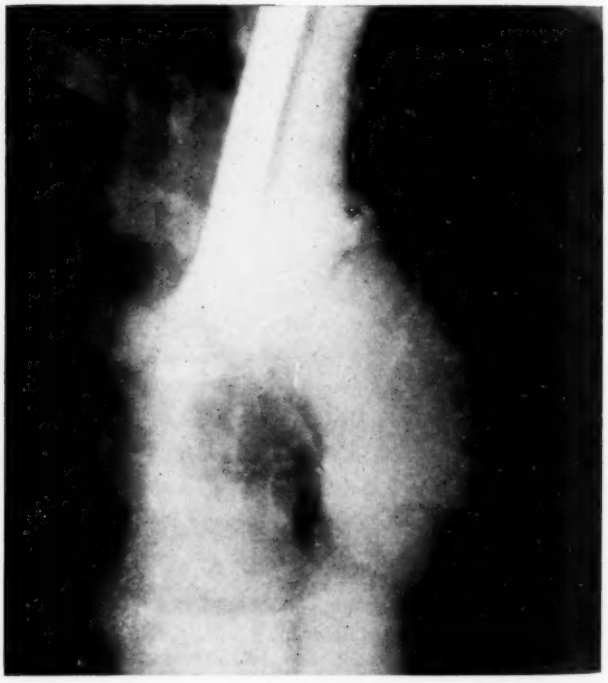

Fig. 4.—Aortogram made on readmission showing bilocular fusiform aneurysm of the aortic arch arising at level of left subclavian artery.

the high incidence of damage to the spinal cord following occlusion of the aorta at this level for considerably shorter periods than this. According to Carrel,[3] for example, paralysis of the hindquarters in the dog usually occurred after occlusion of the thoracic aorta for 10 to 15 minutes, and Blalock and Park [4] found that paralysis developed in almost half their dogs after such occlusion

3. Carrel, A.: On the Experimental Surgery of the Thoracic Aorta and the Heart, Ann. Surg. **52**: 83, 1910.

4. Blalock, A., and Park, E. A.: Surgical Treatment of Experimental Coarctation (Atresia) of the Aorta, Ann. Surg. **119**: 445, 1944.

for periods ranging from 40 to 65 minutes. Somewhat similar results have been reported by others,[5] and studies in our laboratory have confirmed these observations. Thus, in a series of 50 dogs, occlusion of the aorta just distal to the left subclavian artery for a period of one hour produced a mortality rate of 34% and a paraplegia rate of 65% in the surviving animals.[6]

Clinical experience with this problem is limited, but a few reports are available to indicate similar hazards in man. Thus, even in coarctation, paralysis has occasionally followed surgical treatment, although this does not ordinarily constitute a problem, since a well-developed collateral circulation already exists.[7] In a case of a syphilitic aneurysm of the descending thoracic aorta reported by Lam and Aram,[8] in which the period of aortic occlusion was 24 minutes on one occasion and 15 minutes on another, there were some manifestations of cord damage with partial paraplegia before the patient's death from infection and secondary hemorrhage three months after operation. We had a somewhat similar occurrence in a 50-year-old Negro man with a large fusiform syphilitic aneurysm involving the descending thoracic aorta. This was treated by excision and replacement by an aortic homograft, during the performance of which the aorta was occluded for 48 minutes. After operation, the patient manifested some transient evidence of ischemic cord damage, as indicated by temporary weakness and partial paralysis of the lower extremities, with virtually complete recovery over a period of several months.[9]

On the other hand, the aorta has been safely occluded for such periods in a few instances. Thus, Crafoord and associates [10] described a case of patent ductus arteriosus in which the aorta was occluded for 27 minutes without paralysis, and Bahnson [10a] reported cross clamping the distal portion of the aortic arch for 7 minutes during the repair of a traumatic sacciform aneurysm without evi-

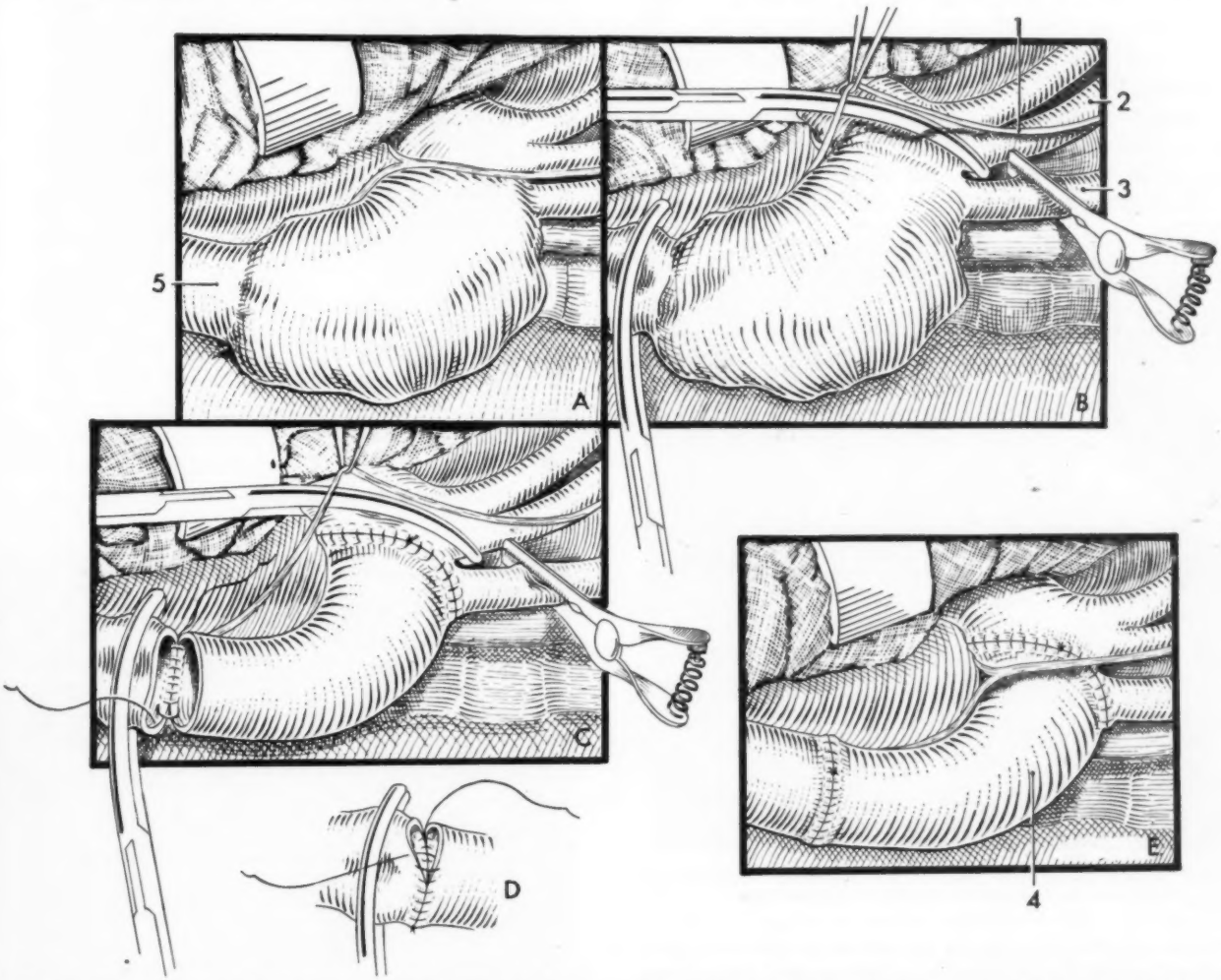


Fig. 5.—Drawing made during second operation showing *A*, anatomic relationship of aortic aneurysm; *B*, application of occluding clamps across aortic arch proximal to left subclavian artery, across descending thoracic aorta distal to aneurysm, and across left subclavian artery; *C*, replacement of excised segment of aorta between occluding clamps with comparable segment of preserved aortic homograft; *D*, technique of anastomosis using continuous through and through suture of 0000 silk surgical suture; and *E*, completed procedure with successful restoration of normal blood flow through graft (1, vagus nerve; 2, left common carotid artery; 3, left subclavian artery; 4, aortic homograft; and 5, descending thoracic aorta).

5. (*a*) Beattie, E. J., Jr.; Adovasio, D.; Keshishian, J. M., and Blades, B.: Refrigeration in Experimental Surgery of the Aorta, Surg., Gynec. & Obst. **96**: 711, 1953. (*b*) Gross, R. E., and Hufnagel, C. A.: Coarctation of the Aorta: Experimental Studies Regarding its Surgical Correction, New England J. Med. **233**: 287, 1945.

6. Pontius, R. G., and others: The Use of Hypothermia in the Prevention of Paraplegia Following Temporary Aortic Occlusion: Experimental Observations, Surgery **35**: 33, 1954.

7. Beattie, E. J., Jr.; Nolan, J., and Howe, J. S.: Paralysis Following Surgical Correction of Coarctation of the Aorta: Case Report with Autopsy Findings, Surgery **33**: 754, 1953. Bing, R. J., and others: The Surgical Treatment and Physiopathology of Coarctation of the Aorta, Ann. Surg. **128**: 803, 1948. Gross, R. E.: Coarctation of the Aorta, Circulation **7**: 757, 1953.

dence of ischemic cord damage. We have also had two patients with aneurysms of the descending thoracic aorta successfully treated by resection and homograft replacement, during which the aorta was occluded for 45 and 37 minutes, respectively, without any manifestations of ischemic damage to the cord or other vital organs.[11] Although this constitutes a limited experience, it seems to suggest that there is some variability in the safe period for temporary occlusion of the descending thoracic aorta and that it is probably influenced by a number of factors, including the nature and duration of the lesion as well as the level of involvement.

The fact remains, however, that occlusion of the aorta at or near the arch for periods ranging up to one hour carries considerable risk of serious ischemic damage to vital organs. Accordingly, this problem assumes practical importance, since the feasibility of operation for lesions in the upper portions of the aorta may depend on its

Fig. 6.—Photograph made at operation after completion of anastomosis of aortic homograft showing restoration of normal blood flow.

effective solution. In general, two methods of attack have been proposed for this purpose, the objective being, in one, to provide a temporary conduit for circulation to the distal segment during aortic occlusion and, in the other, to reduce oxygen demand in the tissues distal to the point of aortic occlusion. The former involves use of temporary intraluminal or external shunts, a method that has been found effective experimentally but that has provided rather disappointing results in a limited clinical experience. A serious objection to this procedure is that it complicates the technical features of the operation, but, with further development and perfection, it holds promise of providing one solution to the problem.

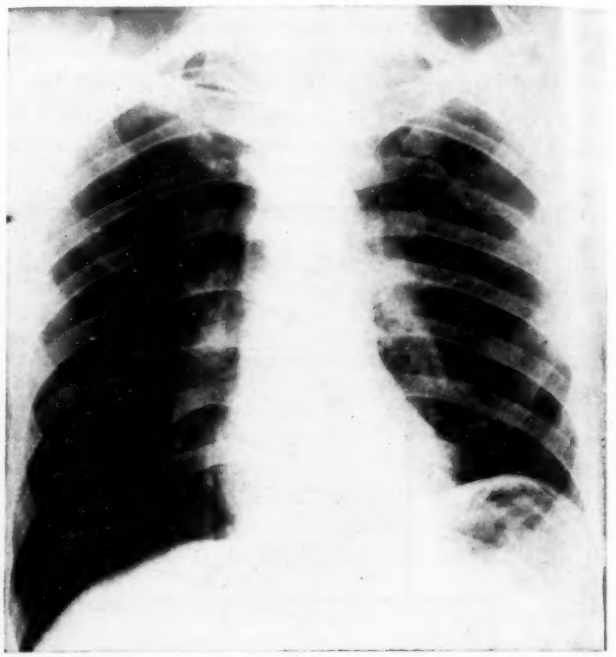

Fig. 7.—Roentgenogram of chest taken two months after second operation showing normal mediastinal shadow.

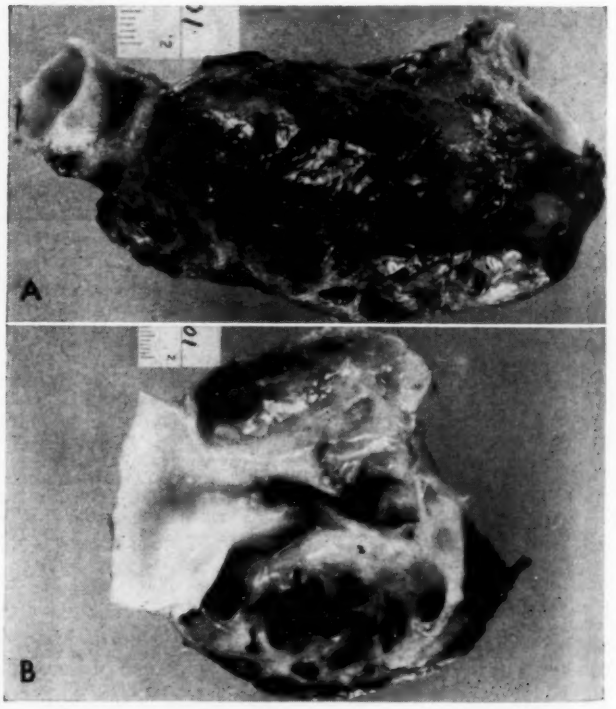

Fig. 8.—*A*, photograph of resected segment of aorta showing fusiform aneurysm, and *B*, opened specimen showing circumferential involvement of the aorta by the aneurysmal process and multiple small sacciform aneurysms in the region of the previous aneurysmectomy.

The other, and simpler, approach to the problem is by means of induced hypothermia, which has been found effective for other purposes in which complete arrest in cardiac output is produced for short periods of 10 or 15 minutes.[12] Some evidence has also been provided experi-

8. Lam, C. R., and Aram, H. H.: Resection of Descending Thoracic Aorta for Aneurysm: Report of Use of Homograft in Case and an Experimental Study, Ann. Surg. **134**: 743, 1951.

9. Cooley, D. A., and De Bakey, M. E.: Resection of the Thoracic Aorta with Replacement by Homograft for Aneurysms and Constrictive Lesions, J. Thoracic Surg., to be published.

10. Crafoord, C.; Ejrup, B., and Gladnikoff, H.: Coarctation of the Aorta, Thorax **2**: 121, 1947.

11. DeBakey and Cooley.[2] Crafoord and others.[10]

12. Bailey, C. P., and others: Cardiac Surgery Under Hypothermia, J. Thoracic Surg. **27**: 73, 1954. Bigelow, W. S.; Callaghan, J. C., and Hopps, J. A.: General Hypothermia for Experimental Intracardiac Surgery, Ann. Surg. **132**: 531, 1950. Swan, H.; Zeavin, I.; Holmes, J. H., and Montgomery, V.: Cessation of Circulation in General Hypothermia: I. Physiologic Changes and Their Control, ibid. **138**: 360, 1953.

mentally to indicate its value in prolonging the safe period of aortic occlusion. Thus, Beattie and associates [5a] found that, while hindquarter paralysis occurred in 4 of 10 dogs when the thoracic aorta was occluded for one hour, there was only one questionable instance of hind-leg weakness in 10 dogs in which hypothermia was induced while the aorta was occluded for the same period. Similar results were obtained in our laboratory, the paraplegia rate being 65% among the 50 normothermic animals in which the aorta was occluded just distal to the left subclavian artery for one hour and zero for the 47 comparable animals in which hypothermia was induced.[6]

These experimental observations seem to indicate that hypothermia is an effective means of prolonging the safe period for temporary arrest of aortic circulation, thus supporting its value in contributing to the successful result obtained in the case reported here. We have had one other case of a similar nature in which the aneurysm involved the distal portion of the aortic arch, requiring resection and replacement by a comparable aortic homograft, including the stump of the left subclavian artery.[9] Cross-clamping of the aorta was done at a similar level for a period of 48 minutes, and the operation was performed after hypothermia was induced in a manner similar to that in the case described here. Unfortunately, the patient died one week postoperatively from uncontrollable septicemia that existed prior to operation, but at no time postoperatively was there any evidence of ischemic damage to the spinal cord or other vital organs. Although this represents a limited clinical experience, it and the experimental observations suggest that hypothermia may permit extending successful application of this form of surgical treatment to aneurysms involving the upper portions of the aorta.


### SUMMARY AND CONCLUSIONS

A fusiform aneurysm involving the distal portion of the arch of the aorta was successfully resected in a patient in whom hypothermia was used and normal blood flow was restored with an aortic homograft. Of significance is the fact that ischemic damage to the spinal cord or other vital organs did not follow occlusion of the aortic circulation just distal to the left common carotid artery for one hour. This experience, together with experimental observation, seems to indicate that hypothermia is an effective means of prolonging the safe period for temporary arrest of the aortic circulation.


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**Fat Embolism.**—Death following fat embolism may be sudden or delayed. Symptoms may be pulmonary, cerebral, or cardiac. The appearance of pulmonary edema in a patient with a fracture of the long bones should arouse suspicion. A sudden increase in respiration, marked elevation of temperature, cough, cyanosis, dyspnea, and the presence of rales in the lungs are all signs which have been observed. The presence of petechias over the abdomen, chest, neck, and conjunctivas, is particularly important. Associated head injuries frequently present a problem in the differential diagnosis. The pathologic diagnosis of this condition may be suspected from examination of routine hematoxylin-eosin stained sections, but must be confirmed by special fat-stain techeniques. The treatment consists of supportive measures, principally that of combating anoxemia.—Lieut. R. L. Buck, Fat Embolism, *United States Armed Forces Medical Journal*, April, 1954.

# CLINICAL NOTES

## TREATMENT OF SUPERIOR VENA CAVAL OCCLUSION BY ARTERIAL GRAFT

### PRELIMINARY REPORT

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*and*
*Israel Steinberg, M.D., New York*

Occlusion of the superior vena cava produces alarming symptoms. The venous engorgement causes ruddy cyanosis and turgor of the face, neck, arms, and upper thorax. Cerebral anoxia resulting from stasis of the cerebral circulation brings on headache, dizziness, and syncope. All these have become known as the superior vena caval syndrome. Relief of this distressing and disabling condition has long been sought, but hitherto, with a few exceptions, surgical attempts to alleviate it have been futile or have given only temporary relief.[1] The use of an arterial graft to reestablish superior vena caval blood flow is reported here. Several months have elapsed since operation, and its success in relieving the condition suggests that a satisfactory method is available for treatment of this circulatory disturbance.

### REPORT OF A CASE

A 26-year-old laborer was admitted to the hospital on Sept. 11, 1953. Three years previously he had had a severe respiratory infection associated with a harsh "racking" cough that lasted over a month. Toward the end of this illness, he noticed swelling of the face and neck, followed shortly by swelling of the arms, a somewhat livid color of the face, reddening of the eyes, and discomfort when lying flat. In addition, within a few months, he noticed enlarged veins over the chest and abdomen. Coincidently he had ringing in the ears and an uncomfortable sense of fulness of the head, with dizziness that became exaggerated on bending over. These symptoms persisted until episodes of momentary unconsciousness prompted his admission to the New York Hospital. On examination, the patient appeared bloated, with a dusky cyanotic color of the face, edema of the head, neck, and arms, and huge distended veins over the thorax and upper abdomen. The patient was afebrile, the pulse and respirations were normal, and the blood pressure was 130/80 mm. Hg. The rest of the examination was unremarkable, except for a 2 cm., freely movable lymph node in the left axilla.

Laboratory examinations revealed that the hemoglobin level was 15 gm. per 100 ml.; hematocrit, 48; and leukocyte count, 8,100 per cubic millimeter, with a normal differential count. The result of the Mazzini test was negative, while that of the tuberculin intradermal test (full strength) was positive. The electrocardiogram was also normal. Venous pressure in the arm was 360 mm. $H_2O$. The circulation time (dehydrocholic acid

From the departments of surgery and radiology, the New York Hospital-Cornell Medical Center.

This study was aided by a grant from the United Hospital Fund.

1. (*a*) Klassen, K. P.; Andrews, N. C., and Curtis, G. M.: Diagnosis and Treatment of Superior-Vena-Cava Obstruction, A. M. A. Arch. Surg. **63**: 311 (Sept.) 1951. (*b*) Gray, H. K., and Skinner, I. C.: Constrictive Occlusion of the Superior Vena Cava: Report of 3 Cases in Which Patients Were Treated Surgically, Surg., Gynec. & Obst. **72**: 923, 1941. (*c*) Samson, P. C., in discussion on Lell, W. A.: Superior Vena Caval Obstruction Syndrome: Report of Three Cases, Ann. Otol., Rhin. & Laryng. **60**: 754, 1951. (*d*) Ehrlich, W.; Ballon, H. C., and Graham, E. A.: Superior Vena Caval Obstruction with a Consideration of the Possible Relief of Symptoms by Mediastinal Decompression, J. Thoracic Surg. **3**: 352, 1934. (*e*) Ochsner, A., and Dixon, J. L.: Superior Vena Caval Thrombosis, ibid. **5**: 641, 1936.

[Decholin]) was 23 seconds. A chest film showed widening of the superior mediastinum, particularly to the right. The heart configuration was normal, and the lung fields were clear. Tomography showed no tracheal distortion. Angiocardiography (fig. 1) showed complete occlusion of the superior vena cava and huge collaterals. Biopsy of the axillary lymph node showed no abnormality.

*Operation.*—On Oct. 9, 1953, the right side of the pleural cavity was opened through a generous anterolateral incision. Figure 2*A* is a drawing of the operative findings. Grossly, the mediastinal lesion was a firm, poorly defined mass that caused

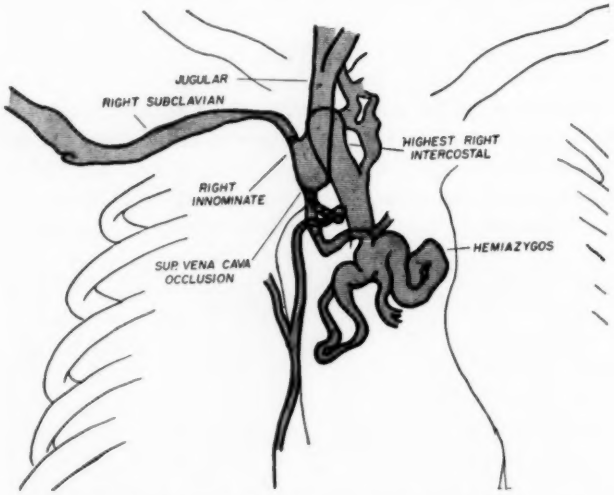


Fig. 1.—Drawing from angiocardiogram showing occlusion of superior vena cava by a superior mediastinal mass on the right and the resultant collateral circulation.

contracture and foreshortening of the surrounding structures. The mass extended inferiorly into the pericardium and superiorly to just below the bifurcation of the right innominate vein. Here the disease process extended directly into the mediastinum so that identification of the left innominate vein was not possible. A rich venous collateral circulation gave a dusky hue to the mediastinal pleura. The highest intercostal vein (fig. 1 and 2) continuing into the azygos vein was tremendously dilated to a diameter of 2 cm. and provided the main channel for blood from the upper right side to reach the inferior vena cava. The opening of the azygos vein into the superior vena cava was completely occluded.

Immediate microscopic examination by frozen section of several generous biopsies taken from the lesion revealed scar tissue without evidence of tumor. Accordingly, it was decided to correct the superior vena caval obstruction by the use of an arterial graft. Dissection of the uninvolved intrapericardial remnant of vena cava was difficult because of the immobility of surrounding structures and inflammatory adhesions between the vein and right atrium. Only about 0.25 in. (0.64 cm.) of vena cava was available for anastomosis. The right innominate vein also was surrounded by inflammatory reaction, but fortunately it was possible to isolate a 0.75 in. (1.91 cm.) segment adequate for anastomosis. The remaining 4 in. (10.16 cm.) segment of involved vena cava proved to be completely occluded, since there was absence of bleeding when it was divided at either end. The choice of a graft long enough to bridge the defect was made from the blood vessel bank. The adult descending aorta was of ideal length and size—the smaller distal end of the graft fitted the innominate vein and the larger proximal end fitted the stump of vena cava. The arterial graft was first anastomosed to the innominate vein, and the graft was then sutured to the vena cava (fig. 2*B*). Just before closure of the final anterior suture line was accomplished, the graft was completely filled with isotonic sodium chloride solution to preclude air embolus when circulation through the graft was started. As soon as the anastomosis began to function, the anesthestist reported immediate improvement in the patient's color.

*Postoperative Course.*—The patient's postoperative course was uneventful. There was immediate, striking improvement in the general appearance and color of his face and upper extremities. Complete collapse of the large varicosities over the thorax and abdomen was quite evident. On the day after operation, the venous pressure in the right arm was 110 mm. $H_2O$; in the left it was 220 mm. $H_2O$. One week later, it was 138 mm. on the right and 138 to 144 mm. $H_2O$ on the left; and two weeks after that the right was 140 mm. and the left was 220 mm. $H_2O$. Within 10 days, edema of the face, neck, and arms had disappeared, and for the first time in three years the patient was able to wear a shirt with his usual collar size. On Oct. 27, 19 days after operation, simultaneous injection of both arms with contrast material was performed and angiocardiograms (fig. 3) were taken. They showed that the arterial graft bridging the superior vena cava was intact and that there was prompt flow of the contrast material from the right arm into the right atrium. The collateral veins had disappeared. On the left side, however, there was occlusion of the innominate vein and opacification of the left hemiazygos system. An intercommunicating collateral was seen between the left and right subclavian veins. The patient was given anticoagulant therapy soon after operation, and on Nov. 3, 24 days after operation, he was sent home completely relieved of all symptoms. The dilated thoracic and abdominal wall veins had disappeared. On frequent follow-up examinations, the patient has been asymptomatic and well.

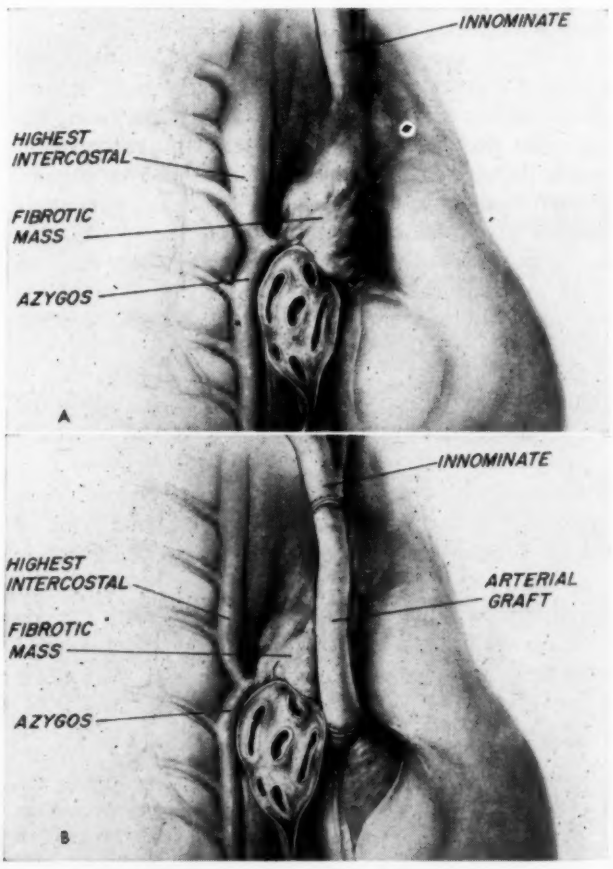


Fig. 2.—Drawing showing *A*, firm fibrous mass occluding superior vena cava and producing collateral circulation, and *B*, correction of superior vena cava occlusion by arterial graft.

## COMMENT

In this case, the cause of the superior vena caval obstruction was obscure but is thought to have been secondary to a nonspecific mediastinitis, probably originating from mediastinal lymph adenitis. Microscopic studies of the mediastinal tissue removed for biopsy failed to show any evidence of tuberculosis or Boeck's

sarcoid (sarcoidosis). The appearance resembled the findings in three cases of fibrous mediastinitis reported by Erganian and Wade.[2]

Other articles [3] report in detail the clinical course and altered circulatory dynamics resulting from obstruction of the superior vena cava. Treatment of superior vena caval obstruction so far reported has been limited to mediastinal decompression,[1d] the release of bands constricting the vena cava,[4] in one case the connecting of the azygos vein to the superior vena cava,[1a] and in another case the connecting of the right innominate vein to the vena cava with a vein graft.[1c] Mediastinal decompression is of questionable value, while anastomosis of vena cava and azygos vein, although a direct method of treatment, may be followed by a gradual diminution in the size of the anastomosed lumen or its actual closure.[5] The ingenious method of bypassing a superior vena caval occlusion by anastomosing the distal end of the occluded superior vena cava to the auricular appendage reported by Gerbode and his associates [5] may prove

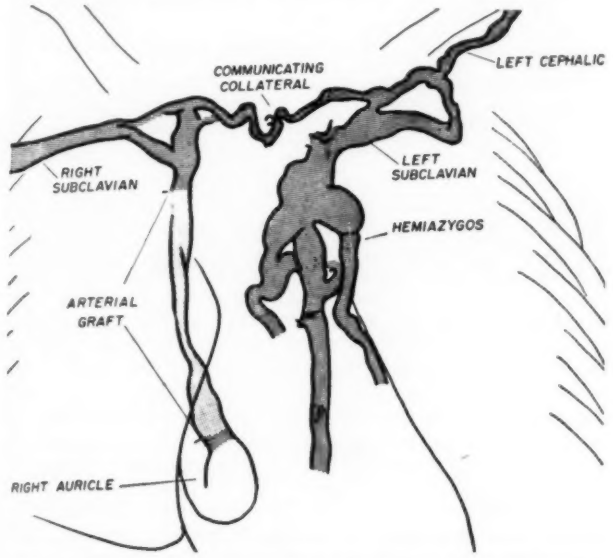


Fig. 3.—Drawing from postoperative angiocardiogram showing functioning arterial graft, occluded left innominate vein, and collateral drainage through the left hemiazygos venous system after injection of contrast medium in both arms.

to be of limited application, because its use depends on a very localized occlusion and on an adequate length of vena cava. They suggest that a venous graft might be useful.

In the case reported here, the preserved arterial graft was ideal for the correction of the superior vena caval occlusion. The size of the adult thoracic aorta approximated that of the veins to be anastomosed when the direction of the artery was reversed. Furthermore, its relatively rigid wall maintains a tube-like structure insuring its patency. Thus is avoided the theoretical objection to the use of a collapsible vein graft that would be subject again to distortion by whatever condition led to the original vena caval obstruction and also to any postoperative fibrosis secondary to the operative trauma. However, if preserved arterial grafts are not available, a dilated mediastinal collateral, an autogenous saphenous vein graft,[1c] or the method employed by Klassen and his coworkers [1a] may be used. Since these grafts are of smaller caliber than the vena cava, one of several appropriate methods suggested by Holman and Hahn [6] for enlarging the lumen at the anastomotic site could be used. It should be borne in mind that vein grafts, because of their tendency to collapse and thrombose, may not be reliable vessels for use in this region.

Angiocardiography, as in other cases of occlusion or obstruction of the superior vena cava,[7] was invaluable in demonstrating the venous channels. Preoperatively (fig. 1), injection of the contrast medium in the right arm established the presence of complete obstruction of the superior vena cava by a mass in the right hilum and showed the extent of the collateral circulation. Postoperatively (fig. 3), by simultaneous injections in both arms, it was possible to see the adequacy of the arterial graft on the right side in maintaining blood flow into the heart. On the left, occlusion of the left innominate vein produced extensive collateral circulation via the hemiazygos and intercommunicating subclavian veins. Angiocardiography adequately reflected the postoperative venous pressure findings. In the right side of the thorax where the arterial graft made the circulation from the right arm patent, the venous pressures were normal. In the left arm where the innominate vein was obstructed, the pressure readings were twice the normal figure.

## SUMMARY AND CONCLUSIONS

Although the period of observation in a patient in whom superior vena caval obstruction was successfully corrected by reestablishing circulation with an arterial graft is short, 10 months, the use of preserved aortic grafts is recommended for relief of superior vena caval obstruction. The desperate plight of patients with such an obstruction warrants continued trial of this procedure.

525 E. 68th St. (21) (Dr. Holman).

2. Erganian, J., and Wade, L. J.: Chronic Fibrous Mediastinitis with Obstruction of the Superior Vena Cava, J. Thoracic Surg. **12**: 275, 1943.

3. Fischer, J.: Ueber Verengerung und Verschlüssung der Vena cava superior, Thesis, Halle, 1904. Blasingame, F. J. L.: Thrombotic Occlusion of Superior Vena Cava and Its Tributaries, Associated with Established Collateral Circulation, Arch. Path. **25**: 361 (March) 1938. Veal, J. R., and Cotsonas, N. J., Jr.: Diseases of the Superior Vena Caval System with Special Consideration of Pathology and Diagnosis, Surgery **31**: 1, 1952. McIntire, F. T., and Sykes, E. M.: Obstruction of the Superior Vena Cava: A Review of the Literature and Report of Two Personal Cases, Ann. Int. Med. **30**: 925, 1949. Carlson, H. A.: Obstruction of the Superior Vena Cava: An Experimental Study, Arch. Surg. **29**: 669 (Oct.) 1934.

4. Footnote 1*a*, *b*, and *e*.

5. Gerbode, F.; Yee, J., and Rundle, F. F.: Experimental Anastomoses of Vessels to the Heart: Possible Application to Superior Vena Caval Obstruction, Surgery **25**: 556, 1949.

6. Holman, E., and Hahn, R.: The Application of the Z-Plasty Technic to Hollow Cylinder Anastomosis, Trans. Am. Surg. A. **71**: 56, 1953.

7. Roberts, D. J., Jr.; Dotter, C. T., and Steinberg, I.: Superior Vena Cava and Innominate Veins: Angiocardiographic Study, Am. J. Roentgenol. **66**: 341, 1951. Dotter, C. T., and Steinberg, I.: Angiocardiography: Annals of Roentgenology, vol. 20, New York, Paul B. Hoeber, Inc., 1951.

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**Rupture of the Spleen.**—When a spleen undergoes spontaneous rupture or ruptures after mild trauma a search for a predisposing cause is indicated. Diseases predisposing to rupture of the spleen may be divided into two categories: (a) diseases easily diagosed by examination of the patient and the removed spleen—leukemia, Gaucher's disease, malaria, sarcoidosis, tuberculosis and acute sepsis; (b) diseases in which the diagnosis may be occult because of a lack of clinical manifestations and of a specific histologic pattern in the spleen—infectious mononucleosis, virus hepatitis and congenital hemolytic disease.—R. N. Frohner, M.D., Trauma and Preëxisting Disease with Rupture of Spleen, *Annals of Internal Medicine,* March, 1954.

# FATAL RUPTURE OF A PRESERVED AORTIC HOMOGRAFT

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*and*
*Jere W. Lord Jr., M.D., New York*

Although preserved aortic homografts were successfully implanted in dogs almost 50 years ago, wide clinical application of this procedure has only recently been made; for the treatment of abdominal aortic aneurysms, it has been used by only a few surgeons in a small total number of cases. The major complications thus far reported have been thrombosis and rupture at the site of anastomosis.[1] This is a report of a complication not previously recorded, namely, rupture of the wall of the graft not contiguous with the anastomosis, resulting in fatal retroperitoneal hemorrhage.

## REPORT OF A CASE

A white man, aged 66 years, was admitted to University Hospital on Sept. 10, 1953. He had had bilateral intermittent claudication, radiating to the low back, for 10 years. Two months before admission he had had a two day episode of severe pain on the left side of the abdomen, and one week before admission he had had a three day recurrence of this pain, with vomiting. Physical examination revealed an apparently well, thin, elderly man with blood pressure of 260/130-80 mm. Hg and a pulse rate of 84 per minute. There was marked narrowing and tortuosity of the retinal vessels. The heart did not appear enlarged. The chest was emphysematous. There was a pulsatile, nontender mass measuring 11 cm. by 7.5 cm. to the left of the umbilicus. A systolic bruit heard in this mass was transmitted distally into both hypogastric areas. Oscillometric studies showed significant diminution of the pulses of both legs, worse on the left side; readings taken at the calf and ankle were, respectively, 1.2 and 1.1 on the right side and 0.7 and 0.5 on the left side. Laboratory examinations showed hemoglobin level, 11.5 gm. per 100 cc.; red blood cells, 4,800,000 per cubic millimeter; white blood cells and differential, normal; and blood urea nitrogen level, 16 mg. per 100 cc.

An operation was performed on Sept. 15, 1953, with the patient under general anesthesia. The aneurysm was exposed through a long rectus incision on the left side. It was fusiform, 11 cm. long, and displaced laterally to the left; it extended from 5 cm. below the renal arteries to the aortic bifurcation. Both common iliac arteries were calcified, but neither was aneurysmal. Strong fibrous adhesions between the aneurysm and the vertebral bodies and inferior vena cava suggested previous extravasation of blood. The aneurysm was dissected free; after the aorta had been clamped proximally and each iliac artery distally, it was excised, with a lower level of excision just proximal to the bifurcation. A 7.5 cm. homologous aortic graft from the New York Blood Vessel Bank was implanted in its place. The anastomoses were effected by a continuous everting mattress suture with no. 00000 silk followed by a continuous over and over suture. By straightening the tortuosity to the left of the superior end of the aorta, enough extra length was obtained that the graft could be implanted without longitudinal tension on the anastomoses. Additional sutures were placed where leaks appeared on reestablishment of blood flow. The graft, including both anastomoses, was covered with absorbable gelatin sponge (Gelfoam) moistened with buffered solution containing antibiotics and heparin just before closure of the wound. The procedure took seven hours, and the aorta was clamped for 135 minutes. The patient received 1,500 cc. of whole blood. His postoperative course was uneventful for eight days. There were good femoral pulses, and blood pressure was maintained at about 140/80 mm. Hg. Ambulation began on the fourth postoperative day. On the night of the eighth postoperative day the patient became semicomatose. His blood pressure was 86/40 mm. Hg; he was pallid and sweaty. He complained of severe low back and abdominal pain. The abdomen was tense and tender. The femoral pulse on the left side was absent. Although the patient was given 250 cc. of plasma and 1,500 cc. of whole blood, his condition deteriorated. After complaining of severe pain in the left leg, which had become cool and cyanotic, he became comatose; six hours later, his blood pressure having fallen to unobtainable levels, he died.

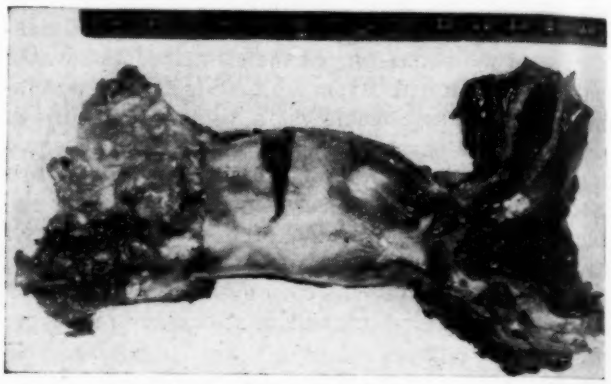

Fig. 1.—Circumferential tear on the luminal surface of the aortic graft at the junction of the proximal and middle thirds. The anastomosis between the graft and the sclerotic aorta is satisfactorily sutured and healing.

At autopsy both anastomoses were found firm and intact. At 1.8 cm. below the proximal anastomosis there was a circumferential tear 2.5 cm. long on the luminal surface of the graft on the posterolateral wall (fig. 1). The graft wall was distended by blood that had dissected from this level distally to the middle of the graft, at which point there was a 3 mm. hole in the adventitia, where the blood had burst into the retroperitoneal space (fig. 2). The inner surface of the graft was generally devoid of intima; isolated fragments, some apparently necrotic, remained, and some were covered by thin fibrin thrombi. The architecture of the media was well preserved, except where the blood stream had bisected the media. There was a diffuse basophilism of the interstitial substance of the media, which was entirely amorphous. The elastic fibers appeared straight and long in parallel lamellas under low magnification, but under high magnification they were seen to be greatly fragmented (fig. 3). The adventitia was coated with clotted blood. In the outermost adventitial layers, as well as in the clot, polymorphonuclear leukocytes and young fibroblasts were seen in some areas.

Fig. 2.—External view of the graft, showing the hole through the adventitia through which the fatal hemorrhage occurred.

This graft had been obtained and preserved in conformity with the criteria stated by Keefer and others,[2] which are based on the work of Gross. The graft was obtained under sterile

From the Department of Surgery, New York University Post-Graduate Medical School and University Hospital.

1. (*a*) Swan, H.; Robertson, H. T., and Johnson, M. E.: Arterial Homografts: The Fate of Preserved Aortic Grafts in the Dog, Surg., Gynec. & Obst. **90**: 568, 1950. (*b*) DeBakey, M. E., and Cooley, D. A.: Surgical Treatment of Aneurysm of Abdominal Aorta by Resection and Restoration of Continuity with Homograft, ibid. **97**: 257, 1953.

2. Keefer, E. B. C., and others: The Blood Vessel Bank, J. A. M. A. **145**: 888 (March 24) 1951.

precautions from the body of a 37-year-old man 17 hours after death and was preserved by the method of Gross. It had been stored 76 days when used.

## COMMENT

It has been reasonably well established that aortic homografts do not survive after implantation, although the elastic fibers of the media may persist with little structural change for considerable periods of time, contributing greatly to the strength of the graft.[1a] In this way the graft serves as a temporary conduit for blood and as a bridge on which the host builds a new, abnormal, but functionally satisfactory tissue for carrying blood.[1a] As it is seldom possible to obtain fresh aortic donor grafts when needed, various methods for their preservation

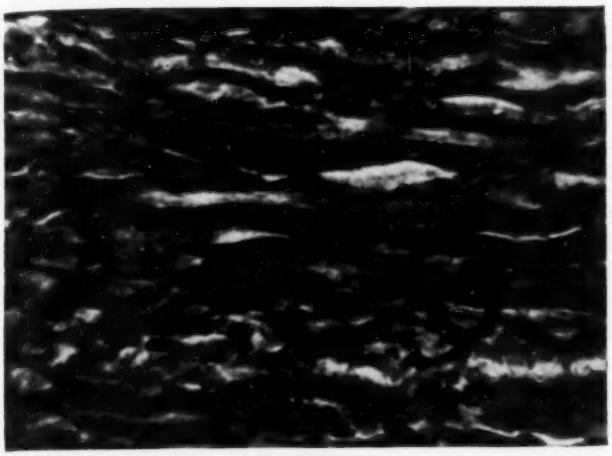

Fig. 3.—Photomicrograph of tissue from the media of the aortic graft. The normally parallel and continuous elastic lamellas are tortuous and fragmented. The interstitial fibrocytes and smooth muscle cells have been replaced by an amorphous material (elastic tissue stain, × 500).

have been devised. Until recently the method of Gross, consisting of storage in a buffered electrolyte solution with 10% blood serum at 1 C (33.8 F) to 4 C (39.2 F), has been most widely accepted. In their research, Gross and associates determined that segments of aortas thus preserved retain their viability for 45 to 50 days. That is, the cells of the aortic tissue are still capable of proliferation in tissue culture if removed from preservative and cultured during this period. They also demonstrated in dogs that the commonest postoperative complications of thrombosis and rupture of the anastomoses are commoner when grafts stored beyond this period are used. This has been corroborated by Swan.[1a]

Although only one graft was available in the blood vessel bank, operation was carried out in this patient because the severe pain suggested leakage of blood through the aneurysm. On operation it was seen that slow leakage had occurred and that thick, cream-like material, presumably from an intima plaque, exuded from a thinned-out area near the distal end of the aneurysm that suggested impending rupture. The graft was adequate in length and appeared similar grossly to others stored by the same method for only 20 to 40 days. Five weeks earlier, on Aug. 12, an aortic graft from the same donor that had been preserved for 42 days had been used successfully by us in another patient with arteriosclerotic aneurysm of the abdominal aorta. This patient did well during the next seven months except for the development of homologous serum hepatitis, from which he recovered uneventfully.

Coleman, Deterling, and Parshley noted in an experimental study that grafts preserved by the method of Gross showed some fragmentation of the elastica after eight days, a considerable increase at one month, and severe fragmentation after three months of storage. We have been unable to find any previous report of this complication in the literature, regardless of the method of preservation of the graft. There have been several reports of grafts preserved by Gross' method and used overage; however, none of those used in humans was over 65 days old. Both Gross and Deterling have reported grafts implanted in dogs after expiration of the period of viability, with storage periods ranging from 48 to 212 days, that have been successful for follow-up periods of two years. However, neither of these authors advocates clinical use of aortic grafts after more than 45 to 50 days of storage.

We conclude that this graft burst because it was overage. The facts that another graft obtained from the same donor and stored for 42 days was used successfully and that the structural changes in the graft noted at necropsy in this case are consistent with the experimental findings of Gross, Swan, and Coleman and associates emphasize the principle that grafts preserved in this manner must be used within the time limits previously determined. The recent development of freeze-dry methods by Marrangoni and Cecchini and by Hufnagel and associates,[3] as well as the use of vascular heterografts, will probably facilitate the function of blood vessel banks and eliminate the use of overage grafts stored by Gross' method.

## SUMMARY

A patient with arteriosclerotic aneurysm of the abdominal aorta, in whom the aneurysm was resected and an aortic homograft was implanted, died suddenly on the eighth postoperative day. At autopsy a rupture was seen near the midportion of the graft. The graft had been preserved for 76 days, considerably longer than the safe limit indicated by the work of Gross and others. Histological study showed changes suggesting that the media of the graft was considerably weakened, presumably owing to the long period of its storage.

55 E. 92nd St. (28) (Dr. Lord).

3. Brown, R. B.; Hufnagel, C. A.; Pate, J. W., and Strong, W. R.: Freeze-Dried Arterial Homografts: Clinical Application, Surg., Gynec. & Obst. **97**: 657, 1953.

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**Multiple Myeloma.**—Clinical diagnosis alone can suggest but cannot establish the existence of multiple myeloma. Evidence cannot be had without laboratory tests. . . . Bone lesions, Bence Jones proteinuria, [and] an increased serum globulin . . . are not unfailingly present together or even separately. . . . Examination of the marrow . . . alone can unmistakably establish the presence of multiple myeloma when the marrow is observed to be replaced by plasma cells. This is not a plea for routine or unmotivated marrow examination. The best diagnostic guidepost against being misled remains an acute awareness that "everything is not what it seems," that the implications of vague and equivocal presenting symptoms must be explored fully, for they may indeed by the clues, however capricious, to the diagnosis of multiple myeloma.—S. O. Schwartz, M.D., and M. Cataldo, M.D., Some Clinical Caprices of Multiple Myeloma: 15 Case Reports from a Study of 75 Cases, *Annals of Internal Medicine*, December, 1953.

# ARTERIOVENOUS FISTULA SIMULATING PATENT DUCTUS ARTERIOSUS

## EVALUATION BY VENOUS CATHETERIZATION AND ANGIOCARDIOGRAPHY

*John B. Johnson, M.D.*
*Alphonzo Jordan, M.D.*
*and*
*John W. Lawlah, M.D., Washington, D. C.*

A continuous, machinery-like murmur in the left upper anterior portion of the chest near the sternum that occurs without history of trauma is so characteristic of patent ductus arteriosus that one may neglect to consider other lesions that produce a similar murmur in this location. We present a case of arteriovenous fistula, presumably congenital in origin, that simulated patent ductus arteriosus but was accurately diagnosed and localized by means of venous catheterization and angiocardiography.

### REPORT OF A CASE

A 31-year-old woman was referred to the cardiovascular service for study because of a continuous, machinery-like murmur over the upper part of the sternum and in the first left costal interspace. The patient had been semicomatose owing to severe diabetic acidosis when admitted to the medical service on Feb. 4, 1953. On admission, the blood sugar level was 471 mg. per 100 cc.; serum carbon dioxide content, 15 vol. %; serum potassium level, 3.64 mEq. per liter; and serologic test for syphilis, positive at 1:64 dilution. The acidosis responded readily to therapy, and the diabetes was kept controlled with suitable diet and administration of isophane insulin (NPH Insulin). The cardiovascular history was essentially normal. The patient had been very active as a child. She had had one full-term, normal pregnancy 12 years previously without cardiac symptoms. There was no history of trauma to the chest. There was a history of antiluetic therapy apparently consisting of two full courses of penicillin, the first of which had been given in 1951 and the second in 1953, just prior to this hospital admission. A detailed cardiovascular examination showed a heart of normal size and regular rhythm. A machinery-like murmur with systolic accentuation was present over the manubrium and the first and second costal interspaces on the left side and was transmitted along the left clavicle. The pulmonary second sound was not accentuated. The blood pressure was 95/65 mm. Hg at rest and 100/65 mm. Hg after exercise. The electrocardiogram was normal, as was the cardiac configuration seen by roentgen examination. The cerebrospinal fluid was normal and gave a negative response to a Wassermann test. The venous pressure was 156 mm. $H_2O$ and 152 mm. $H_2O$ in the right and left antecubital veins, respectively. The arm-to-tongue circulation time was 12.5 sec. and 12 sec. in the right and left arms, respectively.

*Results of Venous Catheterization Studies Done Through Right and Left Antecubital Veins**

| Structures Studied | Oxygen Content, Vol. % | Pressures, Mm. Hg | Oxygen Saturation, % |
|---|---|---|---|
| Left axillary vein | 6.67 | .. | 54 |
| Left subclavian vein | 10.08 | .. | 81 |
| Superior vena cava | 8.90 | 7 | .. |
| Right auricle | 8.43 | 5 | 68 |
| Right ventricle | 7.94 | 25/4 | .. |
| Right pulmonary artery | 7.94 | 26/14 | 64 |
| Left pulmonary artery | 7.63 | .. | .. |
| Brachial artery | .... | 91/51 | 93 |

* Cardiac output was 4.66 liters per minute per square meter of body surface (direct Fick method).

From the Cardiovascular Laboratory of Freedman's Hospital and Howard University.

Supported in part by a grant from the National Institutes of Health.

Venous catheterization of the right side of the heart was done through the left antecubital veins (see table). The cardiac output was moderately elevated. The maximum venous oxygen saturations of 81% in the left subclavian vein and 54% and 64%, respectively, in the axillary vein and the pulmonary artery indicate arteriovenous shunt in the region of the subclavian vein but are not consistent with a patent ductus arteriosus. Angiocardiograms were done with injection of iodopyracet through both the left and right antecubital veins (fig. 1 and 2). Two arteries, apparently originating from the left subclavian artery, go upward and laterally and then descend below the level of the subclavian artery. The larger of these two vessels can be traced to the level of the clavicle, where it appears to expand into a blurred mass at the site of the defect noted in the subclavian vein (fig. 1). Further examination of the neck showed that compression by the finger at the level of the medial end of the clavicle caused marked decrease in the intensity of the murmur and the thrill.

On July 7, 1953, the patient was operated on at another institution; at operation, an arteriovenous fistula was found. The artery involved was a branch of the left subclavian artery, which, with the patient in the recumbent position, ran up into the neck about 1.5 in. (3.8 cm.) and then descended abruptly, dividing just above the level of the subclavian artery. The medial branch terminated in a sac-like structure that was considered to be a dilated section of the subclavian vein. The lateral branch continued downward behind the subclavian artery. The branch of the subclavian artery involved was ligated on the descending limb just before the bifurcation, and its medial branch was ligated just as it entered the venous sac. The thrill disappeared immediately. During the immediate follow-up period, there was complete absence of the murmur and thrill. When the patient was seen six months later, the murmur had returned. Compression in the neck still caused marked decrease in intensity of the murmur and thrill. The blood pressure was 110/70 mm. Hg at rest and 100/65 mm. Hg after exercise. The cardiac surface area on Feb. 2, 1954, was 130 square centimeters; it had been 120 square centimeters on Feb. 13, 1953. The patient refused further surgery.

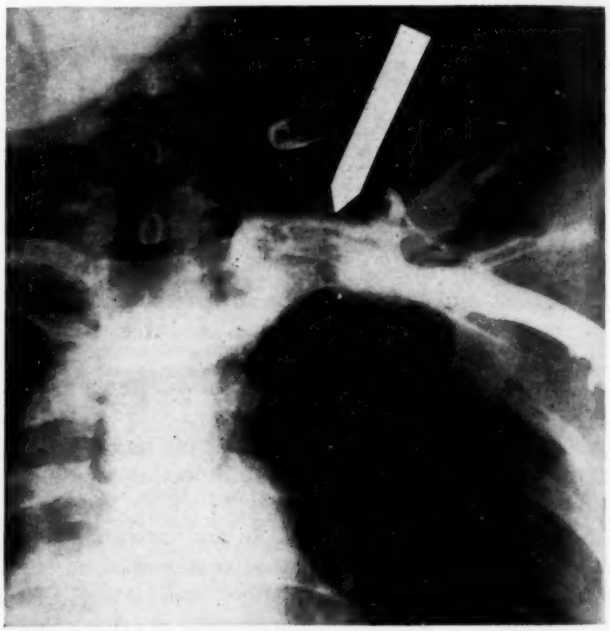

Fig. 1.—Angiocardiogram taken two seconds after injection of iodopyracet in the left antecubital vein. Note the compression defect in the subclavian vein in the region of the sternal end of the left clavicle.

### COMMENT

The machinery-like murmur with systolic accentuation that is characteristic of patent ductus arteriosus may be simulated by a variety of cardiovascular lesions. Venous hums transmitted from the neck downward over

the upper chest may simulate this murmur, but these hums are easily obliterated by compression of the jugular vein, and the accentuation is diastolic rather than systolic. Small aortic septal defects are apparently rare but are said to produce a murmur simulating that of patent ductus arteriosus.[1] Rupture of an aneurysm of a sinus

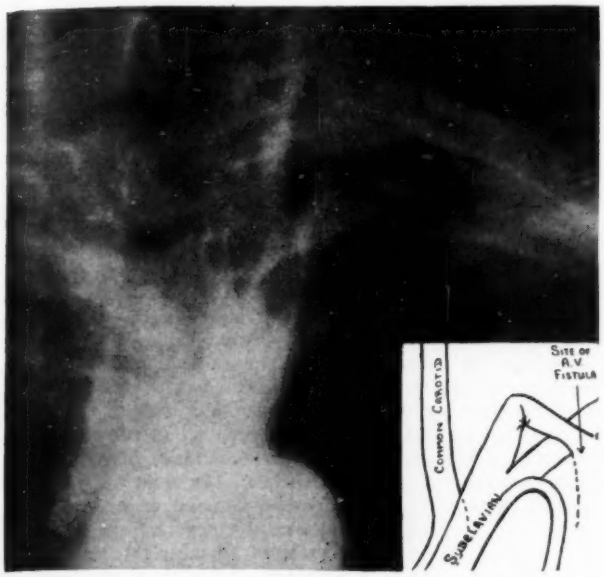


Fig. 2.—Angiocardiogram taken eight seconds after injection of iodopyracet in the right cubital vein. Note the opacification of the aortic knob and the brachiocephalic arteries.

of Valsalva or of a syphilitic aortic aneurysm into the pulmonary artery may produce a typical machinery-like murmur, but in these cases there is usually a history of sudden onset of cardiac symptoms, often with rapidly progressive heart failure.[2] Arteriovenous fistulas in the upper left part of the chest are not uncommon, but usually there is evidence or a history of trauma that allows one to suspect the correct diagnosis. The decrease in intensity of the murmur produced by compression of the neck at the level of the clavicle may be a useful clinical sign in the differential diagnosis of arteriovenous fistula in this area from patent ductus arteriosus. Ordinarily, in the study of patients for patency of the ductus arteriosus, blood samples are obtained from the right ventricle and pulmonary artery. In questionable cases, blood samples should also be taken from the vein in the region where the murmur is intense. In this case the location of the shunt was determined by the blood sample from the medial portion of the subclavian vein. The angiocardiogram was useful in showing details of the lesion. Whether syphilis, for which this patient had received adequate therapy, was related to the development of the arteriovenous fistula was undetermined.

SUMMARY

A congenital arteriovenous fistula between a branch of the left subclavian artery and the left subclavian vein had signs simulating patent ductus arteriosus, and there was no previous history of trauma or cardiac symptoms such as might suggest presence of a traumatic or other sudden development of arteriovenous fistula. Blood samples obtained by means of venous catheterization showed increased oxygen content in the subclavian-innominate vein area, rather than in the pulmonary artery, as would be expected in patent ductus arteriosus. The lesion was well visualized by angiocardiography. Vascular lesions such as venous hums, traumatic arteriovenous fistulas, aortic septal defects, rupture of a sinus of Valsalva into the right heart, and rupture of a syphilitic aortic aneurysm into the pulmonary artery must be differentiated from patent ductus arteriosus despite the presence of findings that are characteristic of that condition.

1. Taussig, H. B.: Congenital Malformations of the Heart, New York, Commonwealth Fund, 1947, p. 344.
2. White, P. D.: Heart Disease, ed. 4, New York, The Macmillan Company, 1951, p 342.

## ANOMALOUS LEFT PULMONARY ARTERY CAUSING OBSTRUCTION TO RIGHT MAIN BRONCHUS

### REPORT OF A CASE

*Willis J. Potts, M.D.*
*Paul H. Holinger, M.D.*
*and*
*Arthur H. Rosenblum, M.D., Chicago*

Vascular anomalies of the aortic arch causing tracheoesophageal obstruction are relatively common. We believe this case of obstruction to the right main stem bronchus by an anomalously placed left pulmonary artery is unique.

Fig. 1.—Roentgenogram showing the tracheobronchial tree with compression of the lower trachea and right bronchus after injection of iodized oil (Lipiodol).

From the Children's Memorial Hospital (Drs. Potts and Holinger) and Michael Reese Hospital (Dr. Rosenblum).

A white baby boy, aged 9 days, was admitted to the Children's Memorial Hospital on April 16, 1953, because of attacks of dyspnea and cyanosis since birth. The infant weighed 9 lb. 8 oz. (4,309 gm.) and had been delivered spontaneously on April 7, 1953, at Michael Reese Hospital after a normal pregnancy. Difficulty in respiration was present immediately after birth and was not improved by the usual tracheal toilet. Because of continuing dyspnea and cyanosis, the child was placed in an incubator with humidified oxygen.

Abnormal physical findings consisted of sternal retractions with each breath, decreased breath sounds on the right side, and displacement of the heart to the left. Roentgenograms made 12 hours after birth showed marked emphysema of the right lung and displacement of the heart and mediastinum to the left. Fluoroscopic examination showed a shift of the mediastinum to the left with each exhalation.

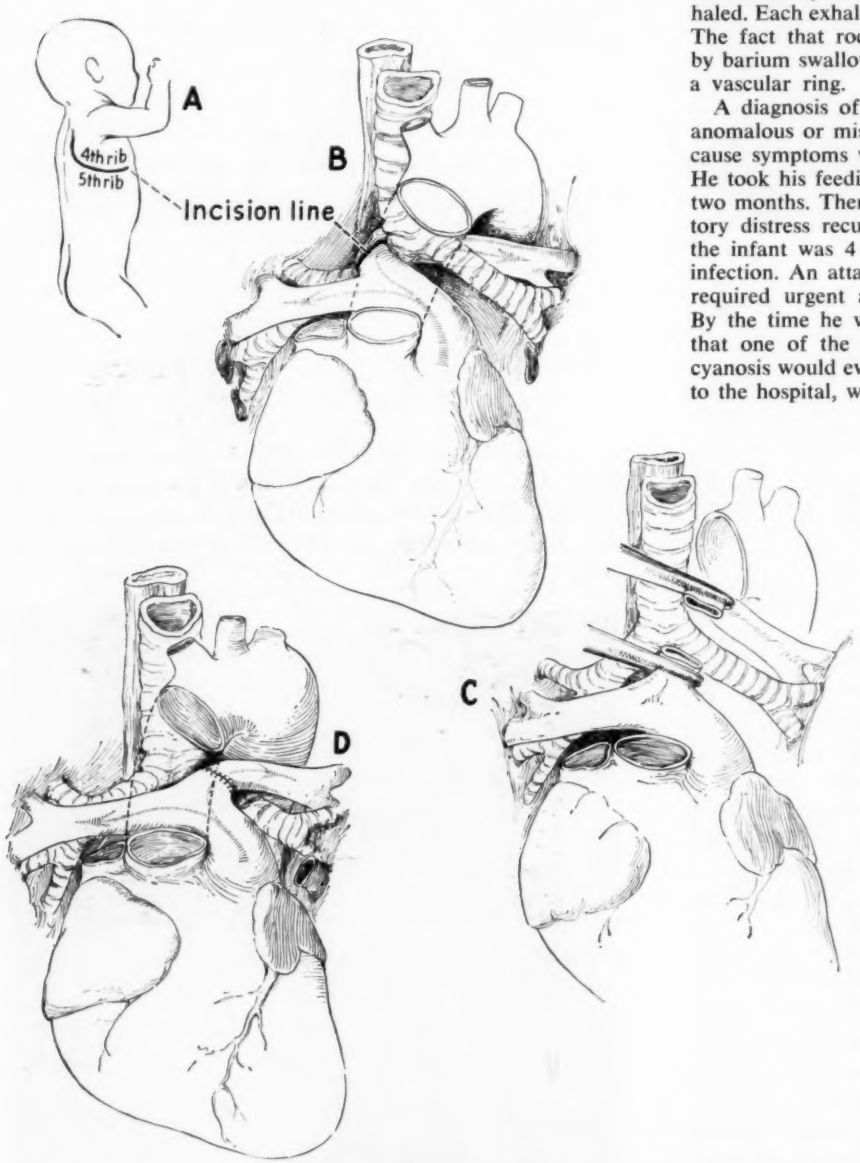


Fig. 2.—*A*, line of incision; *B*, left pulmonary artery courses around and constricts the lower trachea and right bronchus; *C*, left pulmonary artery has been cut and the distal segment moved to the left of the trachea; and *D*, resuture of the left pulmonary artery has been completed.

The child remained in a critical state until the fourth day of life when more or less suddenly his condition improved sufficiently for him to be removed from the humidified oxygen. Nevertheless, roentgenographic findings remained unchanged, and dyspnea without cyanosis persisted. A tentative diagnosis of pressure on the right bronchus by a vascular anomaly was made, and the child was transferred to the Children's Memorial Hospital for endoscopic examination. Bronchoscopic examination revealed a normal, patent larynx and deviation of the trachea to the left. The carina was sharp, and the left main bronchus was normal. However, the lower trachea and the right main bronchus immediately above the upper lobe orifice were compressed to a small slit by pressure on the lateral wall. The bronchoscope could be passed into the bronchus without appreciable resistance, but compression recurred when the bronchoscope was removed.

Emphysema of the right lung was obviously due to partially yielding pressure on the bronchus. Air could be drawn through the obstructed bronchus into the right lung by assistance of the accessory muscles of respiration, but it could not be exhaled. Each exhalation was accompanied by a prolonged wheeze. The fact that roentgenographic examination of the esophagus by barium swallow showed no abnormality practically excluded a vascular ring.

A diagnosis of bronchial obstruction due to pressure by an anomalous or misplaced vessel was generally accepted, but because symptoms were relatively mild the child was sent home. He took his feedings normally, gained weight, and did well for two months. Then, slowly, spells of increasingly severe respiratory distress recurred with constant expiratory wheeze. When the infant was 4 months of age, he had an upper respiratory infection. An attack of dyspnea occurred at the same time and required urgent and persistent treatment with a resuscitator. By the time he was 5 months of age, it had become obvious that one of the constantly recurring attacks of dyspnea and cyanosis would eventually prove fatal. The child was readmitted to the hospital, where bronchoscopic studies were repeated and confirmed the previous findings of yielding external pressure on the right bronchus and the lower trachea. Bronchograms confirmed these findings (fig. 1). The parents at this time realized that, unless something could be done to obviate the attacks of dyspnea and cyanosis, the future of the child was hopeless. The danger of operation and the possibility of being able to accomplish nothing surgically was fully explained to the parents and accepted with equanimity.

On Sept. 30, 1953, the child received 1/400 grain (0.15 mg.) of scopolamine hydrobromide hypodermically one hour before operation. Intratracheal ether and cyclopropane anesthesia was administered by Dr. William O. McQuiston, and the infant's chest was opened through the right fourth interspace (fig. 2*A*). The right upper lobe was collapsed and the hilus of the lung dissected free from surrounding structures. Very promptly a large, abnormally placed vessel about 7 mm. in diameter crossing the hilus of the lung at right angles came into view. The hilus of the lung, the right bronchus, and the lower segment of the trachea were fully exposed. It rather suddenly became apparent that the abnormally placed vessel curling around and compressing the right bronchus was the left pulmonary artery (fig. 2*B*). It was possible to see the main pulmonary artery coursing directly toward the right side and dividing into its two branches directly over the hilus of the lung. The right pulmonary artery went directly to the right lung in a normal fashion; the left pulmonary artery circled around the right bronchus and the lower part of the trachea and then coursed to the left behind the trachea and in front of the aorta and esophagus. It was difficult to know what to do for this child who could not live without relief. One of two courses was open for consideration. The bronchus could be clamped, divided, and sutured lateral to the abnormally placed left pulmonary artery, or the artery could be clamped, divided, and sutured medial to the bronchus and trachea. A pneumonectomy might be done, but the possibility of this extreme course of action was given only brief consideration because of the defeatist attitude it elicited in the face of an unusual situation.

The bronchus was paper thin and transparent at the point of pressure by the artery. Momentary occlusion of both pulmonary arteries resulted in prompt bradycardia and fall in blood pressure. Compression of the left pulmonary artery alone caused no detectable change in color or cardiac action—neither did compression of the right pulmonary artery alone. The left pulmonary artery was compressed for 3 minutes without ill effects whatsoever, while the right lung was expanded to a point that still allowed visualization of the vessel and enough room in which to work. It appeared that division of the left pulmonary artery was safer than division of the delicate right bronchus. The child was able to live on the amount of oxygenation furnished by the partially collapsed right lung.

The left pulmonary artery was grasped with a ductus clamp at its origin from the main pulmonary artery. A second clamp was placed about 1 cm. distal to it, and the vessel was cut. The distal segment was then moved medial to the right bronchus and the trachea where the end was grasped with a third ductus clamp, and the second clamp was removed (fig. 2*C*).

An anastomosis was performed hurriedly with a running suture of 00000 Deknatel (pure Japanese) silk on a no. 9 atraumatic needle. Interrupted sutures undoubtedly would have been superior physiologically, but time was too important to allow for that refinement of technique. The suture was interrupted once. On release of the clamps, there was a bit of bleeding at one point that required a single suture. The lumen of the vessel was not constricted by the running suture (fig. 2*D*). A catheter drain was inserted through the fifth interspace. The chest was closed in layers with running surgical gut and the skin with silk. Immediately on completion of the operation, the child breathed more easily than before. The child was returned to and kept in an oxygenated and humidified tent for two days.

The postoperative course was uneventful, except for mild tracheobronchitis that cleared by the third day after operation. Roentgenograms taken on the 11th day after operation, the day of discharge from the hospital, showed both lungs equally expanded and the heart in its normal position. During four months of observation since the operation, the child has been free from all dyspnea and cyanosis, but still has occasional attacks of mild stridor.

### COMMENT

Review of the literature has failed to reveal a similar case of dyspnea and cyanosis owing to bronchial obstruction caused by an abnormally placed pulmonary artery. We are unable to explain the embryologic mishap that produced this deformity.

The cause of near lethal dyspnea and cyanosis as in this case should not be given undue prominence when dealing with this rather common problem in early infancy. So many other causes are far commoner. However, the remediable obstruction in this child does suggest that when dyspnea and cyanosis are severe and a point of obstruction can be demonstrated the infant deserves an exploratory operation.

707 W. Fullerton Ave. (14) (Dr. Potts).

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**The Postoperative Recovery Room.**—A postanesthesia ward has become an essential addition to a modern surgical suite. Close supervision is provided for the anesthetized patient during the immediate postanesthesia period. Nurses, especially trained to recognize early signs and symptoms of undesirable complications of anesthesia and surgery, maintain continuous observation of the patient. Apparatus and supplies are concentrated in one location to meet any emergencies. The airway is properly controlled until the reflexes return. Oxygen therapy is available to combat hypoxia. Incipient shock states are recognized early and actively treated. This concentration of patients in whom surgical treatment and anesthesia has just been completed has permitted the training of personnel especially adept at treating any postanesthetic or postsurgical emergency. All patients who have had abdominal surgery should be brought to this ward.—M. Karp, M.D., and C. S. Yein, M.D., Anesthesia for Abdominal Surgery, *The Surgical Clinics of North America*, February, 1954.

## ELECTROCARDIOGRAPHIC CHANGES AND BRAIN ABSCESS WITH MALFORMED TRICUSPID VALVE

### REPORT OF A CASE

*Henry C. Gotshalk, M.D.*
*Harold Civin, M.D.*
*and*
*George Mills, M.D., Honolulu, T. H.*

Ebstein's heart malformation is well known in medical literature. According to Taussig [1] the essential feature of this disease is the downward displacement of the tricuspid valve into the right ventricle. The tricuspid valve, instead of arising from the annulus fibrosus cordis, which separates the right auricle from the right ventricle, arises in part from the ring and in part from the wall of the right ventricle. In some instances this deformity is accompanied by either a patent foramen ovale or an auricular septal defect. In this condition cardiac arrhythmias are common, and cyanosis may be present if a septal defect is present.

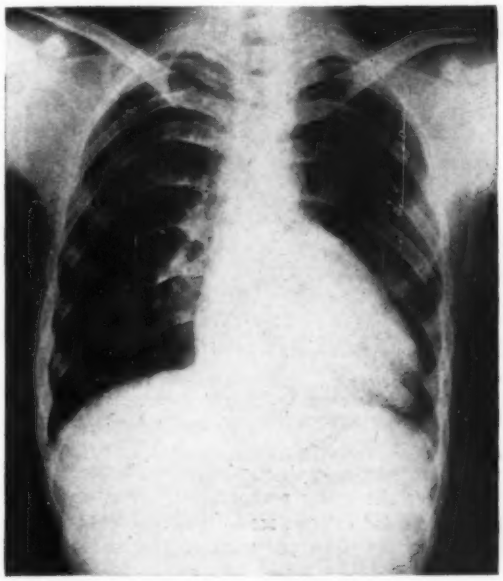

Fig. 1.—Roentgenogram showing cardiac silhouette in patient in case reported on.

This case is reported because a typical Ebstein's deformity was present with a large patent foramen ovale. The patient had a solitary brain abscess with persistently negative spinal fluid and blood cultures. The cardiac arrhythmia present showed the pattern of a short P-R interval with a wide QRS complex associated with a ventricular tachycardia.

A 22-year-old unemployed Japanese man was admitted to the Queen's Hospital on May 23, 1952, with a chief complaint of chills and fever. He stated that about two weeks prior to this admission he had had similar chills, for which he was hospitalized for three days. After a series of injections, he had been discharged. Four days later he again had hospital treatment for chills and fever, but he was discharged after two days' stay. The morning of his admission to the Queen's Hospital he vomited three times, and a severe occipital headache with stiffness of the neck developed.

From the Department of Medicine, Queen's Hospital.

1. Taussig, H. B.: Congenital Malformations of the Heart, Cambridge, Mass., Commonwealth Fund, Harvard University Press, 1947, p. 514.

His medical history showed that he was a "blue baby" at birth and had been examined by his doctor once a year. He had occasional attacks of tachycardia that usually subsided with the use of sedatives. Physical examination on admission showed a well-developed young man who was conscious and apprehensive. His pupils reacted to light and accommodated well, and the ocular fundi were normal. The ears, nose, and throat were normal. There was limited ventral flexion of the neck, but no lymph nodes were palpable. The lungs were clear. The heart beat was regular. The apex beat was visible in the anterior axillary line. There was a palpable systolic thrill over the pre-

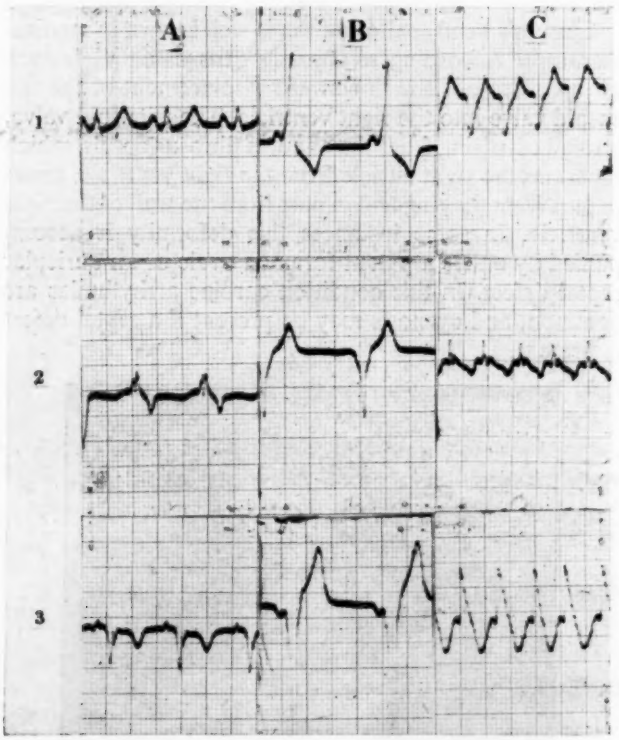


Fig. 2.—Electrocardiograms made with standard leads on patient in case reported on. *A*, regular rhythm. *B*, short P-R interval with wide QRS complex. *C*, ventricular tachycardia.

cordium. There was a loud, rumbling, moderate systolic murmur heard over the entire precordium; it was most intense in the second and third interspaces to the left of the sternum. The cardiac rate was 84 beats per minute. The abdomen was soft. The liver edge was felt 2 cm. below the right costal margin. The remainder of the abdomen was normal. The genitalia were normal. The extremities showed clubbing of fingers and toes and cyanosis of the nail beds. Neurological examination showed essentially normal results. The clinical impression was congenital heart disease, probably the tetralogy of Fallot associated with subacute bacterial endocarditis, and possible meningitis.

Erythrocytes on admission were 7,240,000 per cubic millimeter, with 18.5 gm. per 100 cc. of hemoglobin. The leukocyte count was 12,400 per cubic millimeter, with 85% polymorphonuclears, 14% lymphocytes, and 1% monocytes. The sedimentation rate, Wintrobe method, was zero. Spinal fluid was slightly cloudy and colorless with 175 red blood cells per cubic millimeter; the sugar level was 66 mg. per 100 cc. and chloride, 726 mg. per 100 cc. The total protein was 132 gm. per 100 cc. Urinalysis showed normal results. Four blood and three spinal fluid cultures were negative for any type of organism. The serologic studies showed normal results. Roentgenograms of the chest showed cardiac enlargement of the right ventricle. The pulmonary conus and aortic arch were inconspicuous (fig. 1). The electrocardiogram on admission showed a short P-R interval, 0.09 seconds, with a long QRS interval, 0.12 seconds (fig. 2*B*). A repeated tracing the next day showed an entirely different pattern with a rate of 110, a P-R interval of 0.12 seconds, and a QRS of 0.08 seconds (fig. 2*A*).

During the first two weeks of this hospital admission the patient ran a septic fever with daily temperature excursions between 98 F and 102 F. The pulse rate followed the temperature changes; it varied between 80 and 100 beats per minute. The patient responded very well to the administration of 85 million units of penicillin given parenterally in doses of 4,500,000 units daily. In conjunction with this he was given 500 mg. of oxytetracycline (Terramycin) orally and then 250 mg. every six hours for one week, after which the oxytetracycline therapy was discontinued. After the penicillin therapy, the patient became afebrile and began feeling well. At one point while the patient was convalescing an attack of palpitation suddenly developed. An electrocardiogram showed a ventricular tachycardia (fig. 2*C*). The patient became dyspneic and was given oxygen by mask. Quinidine was given orally in doses of six grains every three hours for four doses. Six hours later the tachycardia ceased, and the patient continued to improve. He was discharged on July 10, 1953, in good condition.

The patient was followed in the outpatient clinic and apparently was well until Sept. 24, 1953, when he was readmitted to the Queen's Hospital. The chief complaint at this time was occipital headache and dizziness. The physical examination showed a 23-year-old lethargic man who did not seem to understand all that was going on around him. He was cyanotic but apparently without respiratory distress. The findings were similar to the last admission except that Brudzinski and Kernig signs were elicited. On this admission it was thought that in addition to the patient's congenital heart disease there was a brain abscess.

Laboratory studies showed erythrocytes, 7,530,000 per cubic millimeter; 22.7 gm. of hemoglobin per 100 cc.; and leukocytes, 12,700 per cubic millimeter, with 80% polymorphonuclears and 20% lymphocytes. Urinalysis showed normal results. A bloody spinal fluid was obtained on two taps. Four blood cultures and two spinal fluid cultures were again negative for organisms. The patient's carbon dioxide combining power was 18.9 mEq. per liter, chloride level 65.5 mEq. per liter, serum sodium 150 mEq. per liter, and potassium 6 mEq. per liter. He was again given

Fig. 3.—Gross specimen of heart showing greatly dilated right auricle. The probe on the right is in the displaced tricuspid valve. The probe on the left is in the widely patent foramen ovale.

2 million units of penicillin parenterally every four hours, day and night, and sulfisoxazole (Gantrisin) diethanolamine orally, 1 gm. every four hours day and night. On Sept. 26, 1953, his fever went to 105 F, and the following day a tachycardia with a rate of 190 beats per minute again developed. An electrocardiogram again showed a ventricular tachycardia. Attempts to control this tachycardia with quinidine given orally, procaine amide (Pronestyl) given intravenously, and other sedatives given parenterally were all of no avail. The patient died suddenly on Sept. 28, 1953, of heart failure.

The autopsy showed the heart to weigh 490.8 gm. The right auricle was markedly dilated, and the left auricle was normal in size. The left ventricle was moderately hypertrophied, and the right ventricle was smaller than normal. The endocardium and papillary muscles were normal in appearance. There was a patent foramen ovale 0.8 cm. in diameter. The coronary ostia and the coronary arteries were patent and free from atherosclerosis. The intima of the aorta was yellow in appearance, and there were small atheromatous deposits on the aorta and aortic cusp. The left ventricular wall measured 2.3 cm. and the right measured 0.5 cm. in thickness. The aortic valve measured 6 cm. and the mitral valve 9.5 cm., and the pulmonic valve was 6 cm. in width. There was a downward displacement of the tricuspid valve that gave the picture of Ebstein's deformity. The right auricle was greatly dilated. There was a downward displacement of the anterior and posterior leaves of the tricuspid valve that left a segment that was part of the right ventricular wall muscle incorporated in the right auricle (fig. 3).

The brain weighed 1,290.3 gm. The cerebral hemispheres were equal, and the convolutions and sulci were normal. Multiple sections through the cerebrum were normal, except there was an abscess on the right occipital lobe that contained brownish-gray mucoid material. This cavity was 2.3 cm. in diameter and was connected to the right ventricle through a 1 cm. opening. Multiple sections through the cerebrum and brain stem were normal. The blood vessels of the circle of Willis were normal.

## COMMENT

The occurrence of brain abscess with congenital heart disease in the absence of bacterial endocarditis is well known, but the cause is still obscure. Maronde,[2] in an excellent symposium, reviewed the autopsy material of 13,883 cases and reported 11 acceptable examples of this syndrome. None of these were associated with Ebstein's deformity. Barger and others [3] reported a case of brain abscess in a patient with Ebstein's malformation and found one other case in their review of the literature.

In 1932 Wolff and others [4] called attention to the short P-R interval and wide QRS complex as a definite entity and noted it was frequently associated with auricular tachycardia or fibrillation. Later Wolferth and Wood [5] postulated that an accessory pathway of A-V conductions might explain this phenomenon. Butterworth and Poindexter [6] were able to support this hypothesis by amplifying the auricular impulse several thousand times and, after a selected delay, passing these impulses through an accessory pathway into the ventricular epicardium or the ventricular muscle, thus reproducing the phenomenon. The mechanism of the short P-R interval and wide QRS complex became more complicated when Levine and Beeson [7] reported three cases of ventricular tachycardia associated with this condition. At present the exact mechanism of this phenomenon is purely speculation. Yater and Shapiro [8] in an excellent review of the literature on Ebstein's disease reported a case with a P-R interval of 0.16 seconds and a wide QRS. Rather than designate this as a bundle branch block, they considered the wide QRS to be due to "an electrical imbalance between the right and left ventricles associated with a prolongation of intraventricular condition time." In this case the electrocardiographic pattern (fig. 1) is that of a Wolff, Parkinson, and White syndrome [9] associated with a ventricular tachycardia, similar to that described by Levine and Beeson.[7]

## SUMMARY

In a patient with Ebstein's cardiac malformation with a widely patent foramen ovale, a solitary brain abscess developed. The patient had persistently negative blood and spinal fluid cultures. The electrocardiographic pattern was that of a Wolff, Parkinson, and White syndrome associated with ventricular tachycardia.

243 Young Bldg. (Dr. Gotshalk).

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# SPECIAL ARTICLE

## ESSAY ON THE BALLISTOCARDIOGRAM

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This article is an essay rather than a scientific publication of the more usual type. Its purpose is not to instruct physicians how to use the method to be described nor to urge them to do so but rather to acquaint them with the main features of this rapidly growing field, emphasizing its difficulties, as well as its background, hopes, and aspirations. I do not propose to review the literature at length, nor to supply a complete bibliography.

Once a week, I hold in my laboratory a conference to which any physician interested in ballistocardiograms is welcome and at which the records taken during the week are shown and discussed. I also take great interest in inspecting any records brought in by those physicians who care to attend, and so, although not actively practicing medicine myself, I have become well aware of the difficulties being encountered by those seeking to employ the method in other hospitals or in their offices. The stimulating discussions at these meetings have led to the growing realization that information of a new kind about the cardiac status of our patients is before us and to the hope that we have the wit to use this information to the benefit of our patients.

When one fires a gun, the recoil kicks him in the shoulder, and, the bigger the powder charge, the greater the kick and the greater the impact of the bullet. Thus reduced to its simplest terms, this is the thought behind the group of instruments called ballistocardiographs, which seek to

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assess the strength of the heart's contraction by recording the movement imparted to the body by the movement of the blood within it.

## HISTORY

The field has a longer history than most physicians realize. Every physician has seen the body move in time to the heartbeats in cases of aortic regurgitation; it was described by Parry [1] in a case of hyperthyroidism seen in 1786 and reported in 1825. As far as I can discover the first record of this movement was made by Gordon in 1877 [2] with a bed suspended from the ceiling, a set of levers, and a smoked drum. Gordon became interested in the idea, because he had noted that, when he stood on spring scales to weigh himself, the pointer moved in time to his heart. This can be seen by anyone standing on well-made spring scales today. Gordon's work attracted some attention, for it was commented on by Trotter [3] and several years later, Landois, in his "Lehrbuch der Physiologie des Menschen" published in Vienna in 1879 [4] discussed it at length; and, after constructing a very simple vertical instrument, Landois made the first clinical observation, describing a patient with aortic regurgitation who gave a record of far greater amplitude than that of a healthy person, a finding confirmed by many today,

I found no other papers on the subject until 1905 when the physiologist Yandell Henderson,[5] ignorant that anyone had preceded him, reopened the field. He first recorded the motion imparted to a suspended table on which the subject lay. This table was free to move in only its longitudinal dimension and this motion was magnified by a set of levers and recorded on a smoked drum. Later, on the Pikes Peak expedition with Haldane and Douglas [6] to study the effects of altitude, he secured some records from a simple type of apparatus, recording the movement of a subject lying on a plank supported on piles of corks.

Some years later, also in ignorance that anyone had been before him, a practicing physician, Dr. Thomas Satterthwaite [7] of New York once again noticed that, when he weighed his patients, the pointer of the office scales moved in time to their hearts. He increased the length of the pointer and secured some records from the tip writing on a smoked drum. Some of these records are fair ballistocardiograms.

In this same decade there was a paper on the subject from Oxford,[8] which described the first use of electric recording, but the means were not well chosen, and the record does not resemble those secured today. Of much greater interest was the observation of the German geophysicist Angenheister [9]—I presume, made quite by accident—that, if he placed his seismograph on a rigid table and a subject lay down beside it, the instrument gave a record that moved in time to the heartbeats. Most of the records he published were normal ballistocardiograms.

In 1933 the Swedish physiologist Abramson [10] constructed a chair that seems as well built as any modern instrument, but, perhaps because of the difficulties concerned with having the subject vertical—interfering vibrations from muscular movements and from the building are more difficult to avoid in this position—he did not persist in his experiments.

My interest dated from hearing Prof. Yandell Henderson mention his old experiments in an informal talk before a group of members of the American Physiological Society interested in the circulation. The first [11] of a long series of papers on this subject, published in 1939, employed the terminology in common use today, while the instrument there described, a resisted table, has served as a model for many of the ballistocardiographs constructed since. Also the theoretical conceptions proposed at that time, relating the amplitude of the record to the force of the heart and its contour to the manner in which the heart ejected its blood, have been largely sustained by later work. The relation of the ballistocardiogram to cardiac output was also studied and certain limitations to its use as a cardiac output method pointed out.

Systematic clinical studies from the same laboratory followed,[12] and since that time about 300 papers on the ballistocardiograph have appeared in medical literature throughout the world, as well as several review articles [13] and three monographs.[14] Indeed, there have been numerous articles on this subject in the lay press as well. This great interest stems from the belief that the record provides information concerning the physiological aspects of cardiac function, and so of the strength or weakness of the heart's beating, of a type not duplicated by the methods of cardiac examination available to clinicians hitherto.

## INSTRUMENTS

The instruments in use at present can be classified into several types. Our original instrument [11] was a table on which the subject lay, free to move only in his longitudi-

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nal dimension, and the movement in this direction, opposed by a strong spring, was magnified by a light beam system and photographed. The more modern resisted tables usually use an electric pickup and amplification system, and often record by a direct writer. These tables, while expensive to construct because they must be very strongly made, are readily calibrated by allowing a weight suspended over a pulley to act on the table, and this force deflects the base line of the ballistocardiogram a measurable distance to which the amplitude of the waves may be compared. These tables are also permanently set up, extremely easy to operate and they give most reproducible results. They have had extensive clinical trial in several medical centers.

The principal criticism directed against the high frequency table is the theoretical one that, even though the heels are firmly pressed against the footboard, the body is not firmly attached to the table, so that the movement of the body with respect to the table will distort the record. This is a valid criticism. Although far too small to be perceived with the unaided senses, tiny movement between body and table was demonstrated by Bouhuys [15] and can be readily measured in our laboratory by means of a microscope. Indeed, a simple remedy has so far eluded us. If one attempts to fix the subject more rigidly to the table, the improvement in the physics of the situation is largely counterbalanced by a loss from the physiological viewpoint, as the subjects are no longer relaxed or basal. The beauty of the present technique is that it does absolutely nothing to disturb the patient, and to preserve this feature we are prepared to accept the error of the movement on the table, minimizing it as we always have by careful attention to getting the heels pressing firmly against the footplate. Other errors of exactly the same kind are inevitable in the transfer of forces through the elastic body tissues from their point of origin in the center of the body to the points on the body surface to which we can attach our apparatus; thus, no ballistocardiograph will ever give a perfect record of the forces that originate it.

The table constructed by Nickerson [16] differed somewhat from that described above. It was also free to move only in the longitudinal direction, but in that direction movement was restrained very little. This arrangement has the advantage that the movement of the body with respect to the table should be very small or absent. But in such an arrangement damping is necessary, and it was added in an amount that differed for each subject; in my opinion, the original technique overdamped the system. Nickerson's technique has had a serious practical disadvantage in that the subject must hold his breath to get the best ballistocardiograms and the position at which the breath is held influences the amplitude of the record. This is a serious disadvantage for use in the clinic, for patients directed to hold their breath often respond in different ways, which may be the reason for the failure of Cathcart and others [17] to get good duplicates by this method.

Tables of the Nickerson type have also been used in the clinic [18] and they can be readily calibrated. Ballistocardiograms from tables of this type differ somewhat from those of resisted tables, as the waves occur later and have a longer duration in time, but they have the same direction and are designated by the same letters.

There has been a promising development in this field recently; von Wittern [19] has demonstrated that if the acceleration, instead of the displacement, of such a table is picked up and recorded, interference with respiratory movements is avoided, while certain theoretical advantages are retained. Electric accelerometers ideal for this purpose, however, are not yet available commercially, and much developmental work remains to be done before a useful clinical instrument of this type can be expected.

In contrast to the expensive table types, the method of Dock [14b] was a great simplification. They placed their patients on any solid table or on the floor, with the heels slightly elevated on a roller; a bar was placed across the shins, and the motion between the bar and the surface was recorded. This motion can be picked up and magnified by one of a number of simple electric means, such as a coil and magnet, a crystal, or a photoelectric cell, and the record secured by connection with a standard electrocardiograph. By such means the body is found to be moving back and forth on the table in time to the heart, a motion permitted by the springiness of the body tissues themselves.

In Dr. Dock's original instrument the velocity of the shin bar was picked up by a coil and magnet system and it was planned to integrate the signal by a condenser and so secure a record of displacement, but the condenser originally chosen for this purpose did not altogether accomplish it,[14b] so that most of the published records lie between a record of velocity and one of displacement.

These portable instruments can be constructed very inexpensively, but, unfortunately, as scientific instruments they are not yet in the class with the table types. The vibration properties of the body moving on its own tissues vary somewhat from person to person, but in the main the range is not so favorable for avoiding distortion as in both types of tables.[19] If the shin bar is heavy, its inertia may cause it to lag behind the movement; if too light it may suffer from lack of a firm attachment to the shin.[20] Because of the properties of the electric circuits used, if a constant force is applied to the body, the base line is deflected only temporarily. Thus, these records are so much more difficult to calibrate than records secured by tables that, although improvements have been suggested,[21] most physicians using portable instruments do not attempt it. In the absence of a calibration, the size of the record has little meaning, and one lacks any simple means of checking on the performance of his apparatus, a matter of importance because the instruments must be set up anew for each subject and small differences in the

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way they are set up may make considerable difference in the record. So it is greatly to be feared that busy physicians, neither well drilled in the techniques nor alert to the sources of error, will interpret as abnormalities of cardiac function distortions due to interfering vibrations and technical errors. Another warning should also be given. Although these records are secured through a standard electrocardiograph, the insertion of 1 mv., a device so satisfactory for the standardization of electrocardiograms, does not suffice to standardize ballistocardiograms recording through electrocardiographic equipment. I have met many physicians who were using such direct body instruments without realizing this fact, and some have told me they were misled on the point by the salesman.

Nevertheless, by experts, interesting records can be secured by the direct body instruments. While the size of the record will remain meaningless until a satisfactory method of calibration can be regularly employed, the abnormalities of contour have meaning, and this is a large and important part of the field.

At a certain sacrifice of convenience, many of the disadvantages of the direct body instruments with electric techniques can be overcome by recording the movement

Fig. 1.—Diagram of the normal ballistocardiogram found in records obtained from resisted tables, with the letters used to designate the waves.

of the shin bar by a light beam magnified by passing through a microscope and recorded by the camera of any standard photographic electrocardiograph.[22] This procedure gives a record of pure displacement that can be readily standardized by the weight and the pulley method, for, when a constant force is applied, the base line is permanently displaced. And it should not be forgotten that any physician can see ballistocardiograms for himself by attaching a pointer to the shin bar, placing his microscope on a table nearby, and focusing the low power on the pointer. Unfortunately, the movement is too rapid to permit the unaided eye to distinguish the individual waves of the ballistocardiogram from one another, but over-all size in comparison with a calibration can be approximated without much difficulty by means of a scale in the eyepiece.

Thus, it appears that two useful types are being developed. The more exact and expensive tables are to be preferred for hospital work; the inexpensive "portable" types could be more conveniently used in the office by those willing to give the time and effort necessary to become expert in the field.

Other types of ballistocardiographs have had much less trial in the clinic than the three described above, but several should be mentioned. Vertical instruments,[23] built to record the ballistocardiogram when the subject stands or sits, have proved less satisfactory for clinical work, because many sick persons cannot stand or even sit without having enough muscular tremor to ruin the record; and these instruments are also more difficult to isolate from the vertical vibrations present in many buildings. Vector ballistocardiographs [24] record movement in any axis of the body, and torsion ballistocardiographs [25] record rotatory movements. Velocity and acceleration ballistocardiographs [26] have usually been direct body instruments with the electric circuits arranged so that these derivatives are recorded, usually in addition to displacement, in the hope that abnormalities of importance would be more readily recognized in them.

## TYPICAL RECORDS

A diagram of the standard normal form and the letters used to designate the waves are shown in figure 1. Typical records are given in figure 2, and brief descriptions appear below.

FIGURE 2.—ROW 1 shows the electrocardiogram and ballistocardiogram of a normal 29-year-old man who is 5 ft. 11 in. (180.3 cm.) tall, weighs 165 lb. (74.8 kg.), and has blood pressure of 110/64 mm. Hg. The record is normal. Row 2 shows the ballistocardiogram of a normal young woman aged 29, who is 5 ft. 7 in. (170.2 cm.) tall, weighs 140 lb. (63.5 kg.), and has blood pressure of 95/60 mm. Hg. A calibration is shown on the left side, with the paper running at slow speed. A force of 280 gm. has deflected the baseline 1 cm. Normal paper speed has resumed at right. This is a typical normal record of a young person. Row 3 is the ballistocardiogram of a healthy man aged 58 who is 6 ft. (182.9 cm.) tall, weighs 186 lb. (84.4 kg.), and has blood pressure of 135/86 mm. Hg. This record is normal. One notes that the respiratory variation is larger than in the two records described above. The depth of the I wave exceeding that of K in most complexes makes the record look like that of a younger man. Row 4 shows the electrocardiogram and ballistocardiogram of a 67-year-old patient who is 5 ft. 3 in. tall (160.02 cm.), weighs 150 lb. (68 kg.) and has a blood pressure of 170/80 mm. Hg. The clinical diagnosis is uncertain. The patient complained of attacks of pain starting in upper abdomen radiating to the chest. The ballistocardiogram is not normal. The larger complexes of the respiratory cycle are altogether normal, but the smaller ones are grossly abnormal. The type of abnormality varies from beat to beat with the position of the complex in the cycle. In the smallest complexes, H far exceeds J in height and J hardly goes above the base line; in the medium complexes, H equals J in height. Row 5 shows the electrocardiogram and ballistocardiogram of a 64-year-old patient who weighs 126 lb. (57.2 kg.), is 5 ft. 3 in. (160 cm.) tall, and has blood pressure of 170/90 mm. Hg. The patient had typical posterior cardiac infarction two years previously with good recovery and is asymptomatic except for dyspnea on exertion. The left side of the record shows a calibration; a force of 280 gm. was released, and the base line shifted. The record is very abnormal; no normal complexes are seen and the highest wave in the record is in mid-diastole. The form of the systolic component varies from beat to beat, but the H

22. Bixby, E. W., and Henderson, C. B.: A Method of Securing the Direct Body Ballistocardiogram by Means of a Microscope, Giving a Record Readily Calibrated, Circulation **8**: 578, 1953.

23. Starr, I., and Rawson, A. J.: The Vertical Ballistocardiograph: Experiments on the Changes in the Circulation on Arising, with a Further Study of Ballistic Theory, Am. J. Physiol. **134**: 403, 1941.

24. Scarborough, W. R., and others: A Method for Recording Ballistocardiographic Vectors: Preliminary Report, Bull. Johns Hopkins Hosp. **87**: 235, 1950.

25. Reissmann, K. R., and Dimond, E. G.: Torsion Ballistocardiography: with Special Reference to Patterns in Surgically Amenable Cardiovascular Diseases, Circulation **8**: 585, 1953.

26. (*a*) Smith, J. E., and Bryan, S.: Studies of Frequency Response in Ballistocardiography, Am. Heart J. **45**: 40, 1953. (*b*) Arbeit, S. R., and Lindner, N.: A New Full-Frequency Range Calibrated Ballistocardiograph; Recording Body Ballistics in Displacement, Velocity, and Acceleration, ibid. **45**: 52, 1953. (*c*) Smith, J. E., and Bryan, S.: Simultaneous Calibrated Recording of Displacement, Velocity, and Acceleration in Ballistocardiography, ibid. **45**: 715, 1953.

wave regularly exceeds or equals the J in height. Row 6 shows the electrocardiogram and ballistocardiogram of a 63-year-old man who is 5 ft. 5½ in. (166.4 cm.) tall and weighs 142 lb. (64.4 kg.). This patient had had frequent attacks of angina pectoris for several years. While he was lying on the table, such an attack came on spontaneously, and this record was taken while he was suffering from precordial pain. At this time his blood pressure was 120/80 mm. Hg. Note the ST deflection in the electrocardiogram and the complete disorganization of the ballistocardiogram, in which, without the simultaneous electrocardiogram, systole could not be located. One notes that the waves, which somewhat resemble normal systolic complexes, to be seen at the right end of the record, are in reality in diastole, and note the almost complete absence of any systolic impacts from their usual position immediately following QRS. Row 7 shows the records of the same subject as in row 6. As soon as the record above was completed, the subject was given a tablet of glyceryl trinitrate to place under his tongue. This relieved the pain in a few minutes. This record was taken about 15 minutes later, at which time the blood pressure was 110/75 mm. Hg. Note the great improvement over the preceding record; recognizable systolic impacts are now present after most QRS complexes. Nevertheless, the record is still very abnormal. Some systolic complexes are completely distorted though an occasional one like the third from the left has attained normality. Note the improvement in the electrocardiogram with the relief in the pain.

Ballistocardiograms must always be read with several important sources of error in mind. Any movement made by the patient distorts the record, so artifacts are common. Tremor may ruin the record altogether. A single distorted complex is of no significance whatsoever, in all probability the patient moved. The rule is that no abnormality of form that is not regularly repeated is worthy of attention, but this does not mean that adjacent complexes must be similar in form, for this is rarely, if ever, seen unless the breath is held. Abnormalities of contour vary with the respiratory cycle, and one looks for comparable complexes in similar positions in other cycles.

Arching of the base line from respiratory movements, sometimes with definite impacts when the diaphragm changes direction, occurs commonly in records from Nickerson-type tables unless the breath is held. Respiratory arching occurs in portable records recording displacement, unless filtered out by a device supplied with some commercial instruments. This respiratory arching is not seen in records of resisted tables if the subject is breathing normally, but it appears if he hyperventilates.

Movements in the building may affect the record. A trolley car passing on the street below puts a fine vibration into my records, although my laboratory is on the eighth floor. Only a little experience is needed to permit one to identify these artifacts at a glance, but too often physicians have mistaken such artifacts for cardiac abnormalities. Examples of the kind of artifacts likely to trip the unwary are given in figure 3. No one not prepared to identify these as artifacts should undertake to read ballistocardiograms.

FIGURE 3.—The ballistocardiogram records are of a healthy young woman aged 22, who is 5 ft. 4 in. (162.6 cm.) tall and weighs 105 lb. (47.6 kg.). After the word of command, indicated by the bar, she responded in the ways given below:

Row 1 is a good record for comparison. The record is altogether normal and about as free of artifacts as most records are. In row 2, the subject moved her arm; great distortion of the record results. In row 3, at the left, she clenched her hand; at the right, she opened and closed her mouth; the distortion resulting is easily seen. In row 4, without opening her lips she opened and closed her teeth at the three places indicated. Unless she had been observed with great care, the movement would have passed unnoticed. Note that the distortion in the record at the left reinforces the systolic ballistic complex happening to occur at the same time; at the middle, the ballistic complex is distorted; at the right, the unwary would call this an extra systole, because it looks so like a normal systolic complex; the electrocardiogram taken simultaneously showed no complex at this time. In row 5, being told to talk, she first inhaled, increasing the amplitude of the record, and then spoke distorting the right end of the record in an irregular manner. In row 6, a streetcar passing on the street below produced the fine vibrations that confuse the central part of this record. In row 7, at the command, she hyperventilated and the true record is utterly destroyed.

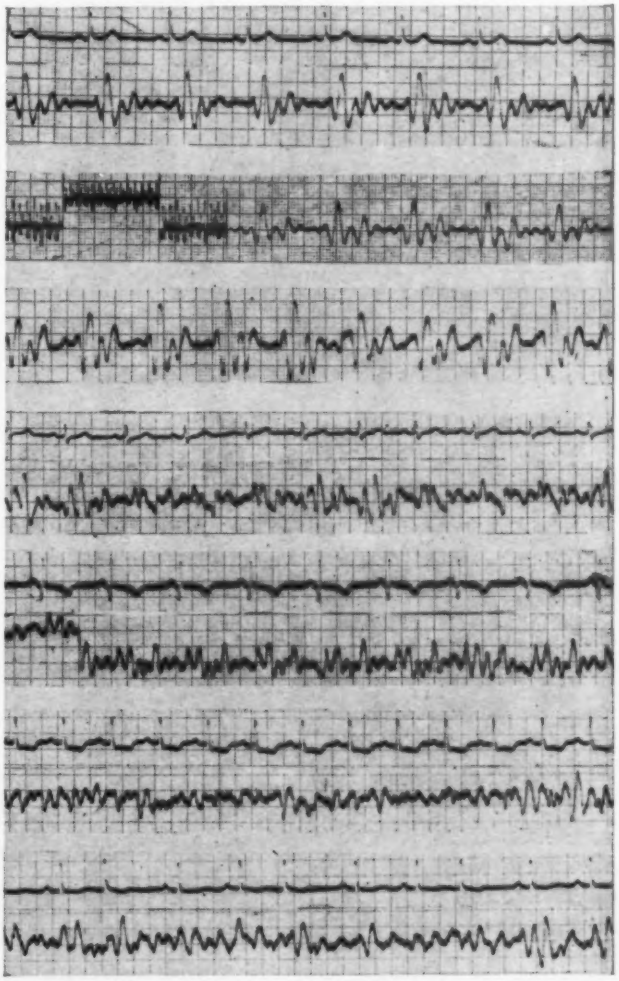

Fig. 2.—Ballistocardiograms taken on a resisted table. The reproductions are 0.4 actual size. (For descriptions of records see text.)

Records secured by direct body instruments are recorded in figure 4 and described below. These may be compared with records made on the same subjects on resisted tables shown in figures 2 and 3. Records made on seven subjects by three methods are given by Nickerson and Mathers.[27]

FIGURE 4.—Row 1 is the record of the subject whose record taken with a resisted table is shown in figure 2, row 3. The comparison is interesting, but one should recollect that the differences in amplitude have no meaning. The direct record shows a weaving of the base line with respiration; the table record does not. The main systolic waves are very similar in both records, but after the K wave the records differ somewhat, M

27. Nickerson, J. L., and Mathers, J. A. L.: A Study of the Physical Properties of the Ballistocardiograph, Am. Heart J. 47: 1, 1954.

being deeper in the table record. Row 2 is a record of the subject of the experiment shown in figure 3. Again both types of instruments give waves that are very similar. In diastole more detail is shown in the table record; the direct record gives the impression of more phase relations of the diastolic waves. Row 3 is the record of the subject whose resisted table record is shown in figure 2, row 2. Again, disregarding the difference in amplitude, the systolic waves are very similar in the two records; however, the difference in early diastole is conspicuous. The L wave almost equals the J wave in height in the direct record, while it hardly passes the base line in the table record. There is clearly more resonance in the direct record, which may be the cause of the difference. Row 4 is the record of the subject

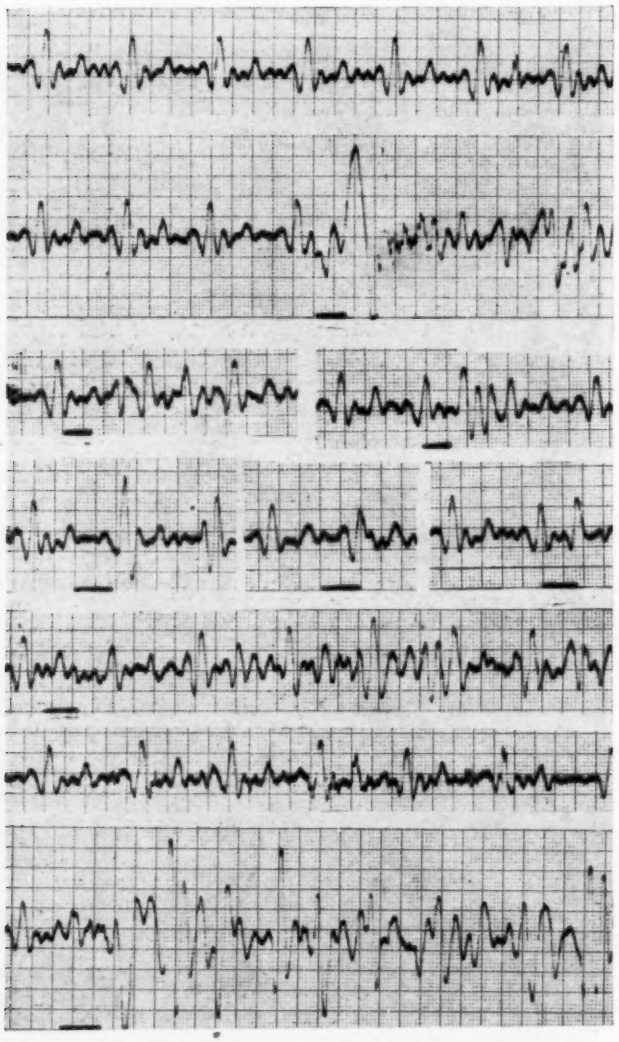

Fig. 3.—Study of artifacts in the ballistocardiogram. The records were taken on a resisted table. (For descriptions of records see text.)

in figure 2, row 1, as he holds his breath. It is taken through a microscope. Note the large L wave that is characteristic of many direct body records.

## INTERPRETATION

There is agreement concerning the genesis of the main systolic waves of the normal ballistocardiogram, and a somewhat oversimplified description is as follows. The footward I wave, beginning at or near the beginning of ejection is caused by the recoil of the body to the headward expulsion of blood by the heart. An instant later the onrushing blood strikes the arch of the aorta and the curve of the pulmonary artery and the headward movement of most of it is arrested, and immediately thereafter the blood in the aortic arch is accelerated footward, both factors combining to cause a headward impact, the J wave, which is the largest wave on the normal record. Then, as systole ends the long column of blood in the thoracic and abdominal aorta is decelerated forming the K wave. The following headward L wave is more conspicuous in records from Nickerson-type tables, and from direct body instruments than in those from resisted tables, but the diastolic waves of normal subjects are always small in comparison with the systolic waves.

Attempts [14b] to relate the small diastolic waves of the normal record to various physiological events occuring during cardiac filling are unconvincing. That cardiac filling causes impacts is not doubted. In some abnormal situations, when venous pressure is high, large diastolic waves may dominate the record, but, in the experiments on cadavers to be described, in which there was no diastolic cardiac relaxation, after-vibrations, soon damped out, follow the systolic waves and persist well into diastole. I prefer to believe that it is the random relation between these after-vibrations and the small impacts due to filling that causes the variation of the appearance of the diastolic records in normal subjects, rather than any physiological differences.

I have left until last the discussion of the headward H wave, which, beginning synchronously with the QRS complex of the electrocardiogram, ascends during the preejection phase of cardiac contraction. Usually absent in auricular fibrillation and when, in heart block, the auricle does not beat at the proper time, it has been attributed to forces set up by the auricular contraction.[28] But normal appearing H waves are seen in some cases of auricular fibrillation and the very large H waves seen in some cases of coronary heart disease lack a clear interpretation.[29] Several possible additional factors in the genesis of H waves include mitral or tricuspid regurgitation [30]; abnormal movement of blood within the heart at the onset of systole, due to the bulging of a weak place in the wall as the pressure rises; and abnormally sudden arrest of the venous blood column when diastole is terminated.[29]

But those with the quantitative viewpoint soon become dissatisfied with purely qualitative descriptions of ballistocardiograms, because these records give promise of giving more exact information. Unlike the electrocardiogram, the ballistocardiogram taken after exercise is greatly increased in amplitude. In all those conditions in which the heart is believed to beat more strongly, the amplitude becomes larger; one is encouraged to investigate the quantitative aspects of the field, and studies in this direction are proceeding from two points of view.

## THEORETICAL APPROACH

Textbooks of vibration mechanics provide formulas that the engineers have found useful in solving their vibration problems. There have been important studies of

28. (*a*) Nickerson, J. L.: Some Observations on the Ballistocardiographic Pattern, with Special Reference to the H and K Waves, J. Clin. Invest. **28**: 369, 1949. (*b*) de Lalla, V., Jr.; Epstein, M. A., and Brown, H. R., Jr.: Analysis of H-Wave, Circulation **2**: 765, 1950.

29. Starr, I., and Mayock, R. L.: On the Significance of Abnormal Forms of the Ballistocardiograph: a Study of 234 Cases with 40 Necropsies, Am. J. M. Sc. **215**: 631, 1948.

30. Kuo, P. T.; Schnabel, T. G., and Kay, C. F.: On Certain Abnormal Ballistic Complexes, Their Relationships to Other Mechanical and Electrical Events of the Cardiac Cycle, Circulation **6**: 74, 1952.

the ballistocardiograph from this physical viewpoint,[31] with the aim of defining the distortion inherent in records secured by various instruments. These studies have employed the formulas developed by physicists, engineers, and mathematicians from observations made on mechanisms containing metal spring, mechanical damping and the like. Such conceptions are certainly applicable to the mechanical and electric instruments used to record ballistocardiograms, but one wonders whether these formulas can be properly assumed to apply to conditions in the body tissues without evidence directly supporting this view.

On the assumption that the body as a whole behaves as a simple oscillator, admittedly a great oversimplification, experiments have been performed to discover its vibration properties,[32] knowledge of which would afford a basis of correcting for the distortion of forces passing through it from heart to table. Attempts have been made to calculate the true forces originating the ballistocardiograms from most elaborate mathematical treatment of the curves themselves [33] (Fourier analysis) and, after correction for the estimated distortion produced by passage through the body, to compare the forces thus calculated with records secured by different types of instruments. The accuracy of such results might well be debated, but there is evidence that the field is beginning to acquire a certain unity. By such an analysis Nickerson and Mathers [27] conclude that the amplitude of records from the Nickerson type of table correlates best with the velocity component of the heart's activity, that is, with momentum; while records of resisted tables correlate best with the acceleration component, that is, with force. Direct body instruments also correlate with force but not so closely as resisted tables. Von Wittern's analysis [19] leads to a slightly different view of the relations between the records from the two types of tables; he agrees that resisted tables record force, but to convert the Nickerson record to one reflecting force he would differentiate it twice, by recording the movement of a free swinging table with an accelerometer. But it is of interest that the agreement is general that resisted tables record force; and indeed it was the Newtonian equation for force that formed the basic equation from which the original theory [11] of resisted tables was derived.

Such studies also suggest that resisted tables would record high frequency components of the cardiac energy better than Nickerson-type tables, while for low frequency components the reverse would be true. This may well be the reason underlying the claim that the effect of coarctation on the K wave is better shown in records from the Nickerson-type tables,[28a] though it was discovered by records from a high frequency table,[14a] and the fact that the deleterious effects of tobacco, which makes such a conspicuous change in both records from resisted tables [34] and direct body records,[35] was not demonstrated in a previous study made with a Nickerson-type table.[36] So it is possible that both types of records will have their areas of special usefulness.

## EXPERIMENTAL APPROACH

As the ballistocardiogram is of large amplitude after exercise and administration of epinephrine, and patients with diseases such as hyperthyroidism and aortic regurgitation, in which the cardiac stroke volume has been found to be elevated, it was natural that the relation between its amplitude and the cardiac stroke volume should be investigated as soon as the technique was thoroughly established.[11] Indeed, at that time there was no other way of testing the ballistic record against any physiological aspect of cardiac function. Various formulas relating the two were tried and, although no great accuracy was expected, strong correlation was found in several investigations.[37] But the limitations of the relationship were apparent from the first; when the form of the ballistocardiogram became abnormal the relation demonstrated for normal records could not be expected to apply.[11] So when used in persons in health, or in patients with normal hearts, results secured from the ballistocardiogram have been, in general, much like those obtained by other cardiac output methods.[38] But when used in the clinic on a group of patients, many of whom had abnormal hearts, the only formula tested extensively, that relating cardiac output to records secured with Nickerson-type tables,

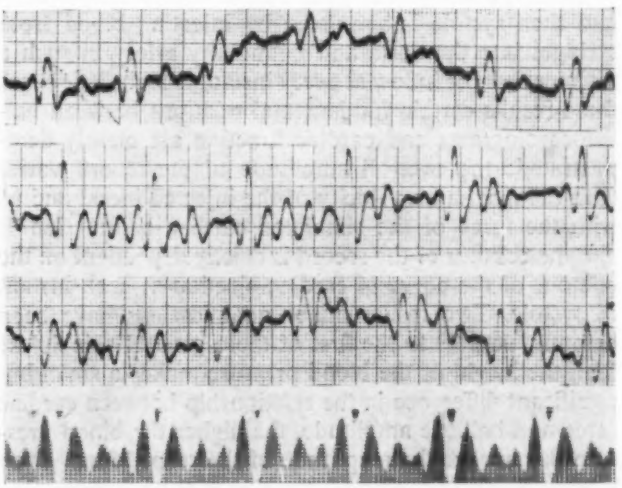

Fig. 4.—Direct body ballistocardiograms. The first three were taken by a photoelectric cell and shin bar; the last was by the microscope method. (For descriptions of records see text.)

gave results having no significant correlation with those secured by the Fick method.[17] I have never understood the reason for the inclusion of blood pressure in Nickerson's formula,[37b] but the reason why ballistocardiographic formulas, working reasonably well in health, should be expected to give erroneous results in heart dis-

31. von Wittern.[19] Smith and Bryan.[26c] Nickerson and Mathers.[27]
32. von Wittern.[19] Smith and Rosenbaum.[30] Nickerson and Mathers.[27]
33. Braunstein.[14c] Nickerson and Mathers.[27]
34. (*a*) Henderson, C. B.: Ballistocardiograms After Cigarette Smoking in Health and in Coronary Heart Disease, Brit. Heart J. **15**: 278, 1953. (*b*) Davis, F. W., Jr., and others: The Effects of Exercise and Smoking on the Electrocardiograms and Ballistocardiograms of Normal Subjects and Patients with Coronary Heart Disease, Am. Heart J. **46**: 529, 1953.
35. Caccese, A., and Schrager, A.: The Effects of Cigarette Smoking in the Ballistocardiogram, Am. Heart J. **42**: 589, 1951.
36. Levy, R. L.; Mathers, J. A. L.; Muller, H. A., and Nickerson, J. L.: Effects of Smoking Cigarettes on the Heart in Normal Persons and in Patients with Cardiac Disease, J. A. M. A. **135**: 417 (Oct. 18) 1947.
37. (*a*) Cournand, A.; Ranges, H. A., and Riley, R. L.: Comparison of Results of the Normal Ballistocardiogram and a Direct Fick Method in Measuring Cardiac Output in Man, J. Clin. Invest. **21**: 287, 1942. (*b*) Nickerson, J. L.; Warren, J. W., and Brannon, E. S.: The Cardiac Output in Man: Studies with the Low Frequency, Critically-Damped Ballistocardiograph, and the Method of Right Atrial Catheterization, ibid. **26**: 1, 1947. (*c*) Starr and others.[11]
38. Starr, I., and Schroeder, H. A.: Ballistocardiogram: II. Normal Standards, Abnormalities Commonly Found in Diseases of the Heart and Circulation, and Their Significance, J. Clin. Invest. **19**: 437, 1940.

ease seems clear enough. The resisted tables measure cardiac force primarily; under normal conditions, when the heart beats more forcefully, the stroke volume increases; but in disease, or indeed as age advances,[39] the weakening heart accelerates the blood more slowly. This change diminishes the force required to produce a given stroke volume, and so conserves the heart's strength. It is this change in the relationship between cardiac force and stroke volume that throws off the results of the ballistocardiographic cardiac output formulas when used in abnormal hearts; the formulas known at present should not be used under such conditions.

For these reasons it seemed that sound progress in relating the ballistocardiogram to the heart's physiological functions required that the records be secured under conditions in which the curve of cardiac injection at each instant of systole was known. So after five years of development and practice, a technique of simulating systole in cadavers lying on a ballistocardiograph at necropsy has been perfected.[40] In these experiments a "diastolic" pressure is developed by perfusion into the femoral artery and then systole is simulated by injecting blood from syringes into the aorta and pulmonary artery in such a manner that the inflow at every instant is recorded. From these results certain fundamental relations between ballistocardiograms and cardiac function are clearly demonstrated: the over-all amplitude of the record varies with the maximum velocity of the injected blood and so with the force of the simulated cardiac contraction[41]; and the contour of the record is chiefly dependent on the contour of the curve of cardiac ejection at each instant of systole. Two rather minor qualifications have been demonstrated[40b] to the first of these general principles: first, the height of the blood pressure makes a small but significant difference in the relationship between cardiac force and ballistic amplitude, the higher the blood pressure the smaller the amplitude of the record for a given cardiac force, and, second, the size of the subject makes a difference; the larger the subject the smaller the percentage of his cardiac force that escapes to produce the ballistocardiogram. While corrections for both of these qualifications have been worked out, their influence is so small that they can be neglected for clinical work at this time. In general, one can regard the amplitude of the ballistocardiogram as measuring the force of the heart.

In these experiments, when a normal heart beat is simulated by an injection that attains maximum velocity early in systole, the resulting systolic ballistocardiograms look identical with those found in healthy young adults during life, save that the experimental records lack H waves. Whereas, if a weak heart beat is simulated[29] by an injection that attains maximum velocity late in systole, the form of the record is changed, the I wave diminishes or disappears, J is small and retarded and a deep downstroke, the K wave, becomes the major feature of the record. This type of abnormality is often seen in records taken in patients judged by other criteria to have cardiac disease.[29]

If the aorta and pulmonary artery are injected asynchronously, various distortions of the record result, the most conspicuous being a splitting of the J wave.[29] Thus, it will be seen that the experimental quantitative analysis of ballistocardiograms has been carried further than that of the electrocardiogram, and by simulating changes in the manner of the cardiac contractions we can reproduce experimentally the common form of the record found in healthy persons, as well as many of the variations from the normal found in sick persons. One has every reason to believe that the genesis of many common abnormalities is clearly understood.

## CLINICAL STUDIES

While the experimental and theoretical studies have been proceeding slowly, the empirical study of ballistocardiograms secured in the clinic has been the subject of so much interest that only the main features of the field can be reviewed here. Fortunately, while many points remain to be cleared up, there is an extraordinary amount of agreement about the main features of the field.

It is the universal experience that healthy young adults give normal records almost without exception.[42] Literally thousands of subjects have been tested by all sorts of methods always with this same result, and this is an impressive feature of the field. As age advances, even though health commensurate with one's age is maintained, the average amplitude of the record diminishes,[38] and obviously the heart must be contracting less forcefully. The contour changes also, the amplitude of the I and J waves diminishing while K remains deep.[38] With experience one can make a fair guess at the decade of life of healthy subjects by inspection of their ballistocardiograms. But beside this "normal" effect of aging, an increasing proportion of truly abnormal records is found as life advances, even though the ordinary clinical study is negative.[43] To explain this it has been pointed out that the proportion of normal to abnormal records corresponds in general to the proportion of patients showing coronary arteriosclerosis at necropsy as age advances.[14b] It has always seemed to me that our profession as a whole did not sufficiently realize the fact that many patients show advanced coronary sclerosis at necropsy without ever having suffered from angina pectoris or cardiac infarction; or indeed, from any cardiac abnormality detected by the clinical methods available hitherto.

Ballistocardiograms taken in patients suffering from the commoner clinical conditions may be abnormal in one or two of three ways. The records may be too large or too small in amplitude or abnormal in contour. The first two abnormalities can be diagnosed only by records from instruments that can be calibrated. Records of abnormally large amplitude are found chiefly in cases of hyperthyroidism, severe anemia, and advanced chronic

39. Starr, I., and Hildreth, E. A.: The Effect of Aging and of the Development of Disease on the Ballistocardiogram: a Study of 80 Subjects, Originally Healthy, Followed from 10 to 14 Years, Circulation **5**: 481, 1952.

40. (*a*) Starr, I.; Horowitz, O;. Mayock, R. L., and Krumbhaar, E. B.: Standardization of the Ballistocardiogram by Simulation of the Heart's Function at Necropsy; with a Clinical Method for the Estimation of Cardiac Strength and Normal Standards for It, Circulation **1**: 1073, 1950. (*b*) Starr, I.; Schnabel, T. G., Jr., and Mayock, R. L.: Studies Made by Simulating Systole at Necropsy: II. Experiments on the Relation of Cardiac and Peripheral Factors to the Genesis of the Pulse Wave and the Ballistocardiogram, ibid. **8**: 44, 1953.

41. Starr, I., and Schnabel, T. G., Jr.: Studies Made by Simulating Systole at Necropsy: III. On the Genesis of the Systolic Waves of the Ballistocardiogram, J. Clin. Invest. **33**: 10, 1954.

42. (*a*) Scarborough, W. R., and others: A Ballistocardiographic Study of 369 Apparently Normal Persons: Analysis of "Normal" and "Borderline" Ballistocardiograms, Am. Heart J. **45**: 161, 1953. (*b*) Brown and others.[14a] (*c*) Scarborough and others.[12b] (*d*) Starr and Schroeder.[38]

43. Starr and Schroeder.[38] Scarborough and others.[42]

pulmonary disease; at the onset of fever; in the presence of arteriovenous communications; in aortic regurgitation; often in diagnosed neurocirculatory asthenia; and in certain emotional states. Records that are abnormally small in amplitude are usually found in myxedema, in a large variety of cases of advanced heart disease of various types, often but not always in congestive failure, and in any moribund patient.

It is the abnormalities of form that have attracted most attention, because they can be detected with such simple apparatus and recognized at a glance without measurement. They are so varied that a brief description is impossible. Figure 2 shows several abnormal records.

At first glance a severely abnormal ballistocardiogram looks like complete confusion especially to one accustomed to inspecting the processions of identical complexes which characterizes most electrocardiograms. A procession of similar complexes is seen on ballistocardiograms only if the subject holds his breath, because the ballistic form tends to vary with the respiratory cycle, most nearly approaching normal at full inspiration and being most abnormal at expiration. This phenomenon can be thought of as a beautiful example of Starling's law of the heart, the weakening heart contracting best at that point in the respiratory cycle in which it is best filled. Many records are seen in which only the smallest complex of the respiratory cycle is abnormal and others in which only the largest complex has remained normal. Figure 2, row 4, shows a record in which the larger complexes of the respiratory cycle are normal and the smaller complexes abnormal in form; such records are very common. Indeed, patients in declining health in whom the abnormality, starting in the smallest complex, spreads throughout the record with the passage of time have been followed. The percentage of abnormal complexes can be properly regarded as a guide to the severity of the myocardial impairment.

Another method of grading the severity of the myocardial involvement was suggested by Brown,[14a] who classified abnormal records in order of severity as follows: (1) the amplitude of the smallest complex of the respiratory cycle diminished in relation to the largest, (2) the smaller complexes becoming abnormal in form, (3) the form abnormality involving all the complexes, and (4) the record becoming so confused that the ordinary landmarks are obliterated and even the position of systole cannot be recognized without the aid of a simultaneous electrocardiogram or pulse tracing.

This classification has proved to be useful, but I have some reservations about the first of these classes of abnormality, because any normal person, by hyperventilating can greatly increase the difference between the amplitude of his large and small complexes and voluntarily make himself abnormal by Brown's standards. I have had many instances of apprehensive patients whose records fall into Brown's class 1, because they were hyperventilating from apprehension of the test. After discovering that the test entailed no discomfort whatsoever, their records became normal.

Besides the abnormalities that can be thus broadly described, the abnormal ballistocardiogram contains deviations from the normal contour, slurs and notches of normal waves, diminution or absence of normal waves, and the appearance of abnormal waves, the exact significance of which cannot be given at present but which, chiefly found in patients with hearts judged to be abnormal by other criteria and never found in healthy persons, may be properly regarded as indicating abnormality of cardiac function. The diseased heart appears to lose the fine coordination of the normal contraction, and this confuses the ballistocardiogram.

Persons judged to have heart disease by the ordinary clinical criteria may or may not have abnormal ballistocardiograms. Most elderly patients judged to have coronary heart disease give very abnormal records; few do not.[44] Most patients with congestive failure give very abnormal records,[45] but again the exceptions are conspicuous. Children with severe congenital heart disease often have normal records, but my experience in this field is not great. Perhaps, excepting the children, it seems proper to generalize as follows: When heart disease is believed to be severe by the ordinary clinical criteria, the ballistocardiogram is usually abnormal. The exceptions, of course, are of the greatest interest, for it is beginning to appear that the clinicians' impression of the strength or weakness of the heart, based on the indirect methods available in the past, though probably right in the majority of the cases, was often conspicuously wrong.

Changes in the record with changing conditions of disease are often conspicuous.[46] An example is given in figure 2 of a record secured during an attack of angina, which, taking place spontaneously while the patient was on the table, was accompanied by a marked abnormality of form, a disorderly type of change, suggesting that the usual fine coordination of the cardiac contractions had been lost; and rapid improvement of the record accompanied the relief of pain brought about by nitrites, but the record did not become normal. Similarly an acute cardiac infarct is usually but not always accompanied by an abnormal ballistocardiogram [47] that may or may not improve slowly in convalescence. But, especially in the younger group, a typical clinical picture and strong electrocardiographic evidence of cardiac infarction are not necessarily accompanied by an abnormal ballistocardiogram taken with the patient at rest. In congestive failure the distorted ballistocardiogram of small amplitude often improves as the patient responds to therapy.[45] On the other hand the typical picture of congestive failure may be accompanied by a ballistocardiogram altogether normal in form. I have had one patient with advanced pulmonary disease who, in congestive failure for the fifth time, had a ballistocardiogram not only normal in contour but abnormally large in amplitude. Undoubtedly such cases belong to the group now called high output failure. Arrhythmias like auricular fibrillations are usually accompanied by ballistocardiograms markedly abnormal in contour, but

44. Scarborough, W. R., and others: A Ballistocardiographic and Electrocardiographic Study of 328 Patients with Coronary Artery Disease: Comparison with Results from a Similar Study of Apparently Normal Persons, Am. Heart J. **44**: 645, 1952.

45. Starr, I.: Clinical Studies with the Ballistocardiograph; in Congestive Failure, on Digitalis Action, on Changes in Ballistic Form, and in Certain Acute Experiments, Am. J. M. Sc. **202**: 469, 1941.

46. Starr, I.: Further Clinical Studies with the Ballistocardiograph; on Abnormal Form, on Digitalis Action, in Thyroid Disease and in Coronary Heart Disease, Tr. A. Am. Physicians **49**: 180, 1946. Starr.[48]

47. Starr, I., and Wood, F. C.: Studies with the Ballistocardiograph in Acute Cardiac Infarction and Chronic Angina Pectoris, Am. Heart J. **25**: 81, 1943.

this is not always the case.[48] I have many records taken in patients with this arrhythmia that are altogether normal except for the spacing in time and the disappearance of the H wave; so it is not the arrhythmia itself that causes the abnormality of cardiac contractions but the myocardial deterioration that so often accompanies it. Extrasystoles occurring too soon after the previous beat to allow proper filling are likely to give small ballistocardiograms, but the next normal beat coming after a prolonged diastole is likely to give a large one. In heart block the isolated auricular beats produce a recognizable series of small impacts,[49] and the best ventricular complex is likely to accompany the ventricular contraction following an auricular beat in its usual position.

The effect of therapy on ballistocardiograms may be profound. Digitalis will restore the contour of an abnormal record to normal, or nearly so, in some cases but not in all.[46] Nitrites may restore the form to normal or cause its improvement, even though the patient is not having angina; but in some patients they may cause the record to deteriorate. The relief of hypertension by drugs or surgery is sometimes accompanied by a great improvement in the record.[50] On the other hand smoking a cigarette, which does not affect the record of healthy young adults, has an adverse effect on the ballistocardiogram of a considerable percentage of healthy persons over 50 years of age and in a much larger percentage of those with angina pectoris or cardiac infarction.[34] In hyperthyroidism ballistic abnormalities are often encountered when the ordinary cardiac studies are negative, and the improvement of the record after effective therapy is often spectacular.

In several of my cases the modern cardiac operations were immediately followed by marked deterioration of the ballistocardiogram, and I believe that the immediate deleterious effect of these procedures on myocardial function has been underestimated. But, if the patient survives, he recovers from this untoward effect and the final result may show most gratifying improvement over the original record. Indeed, older persons subjected to any extensive surgical procedure are likely to show some temporary deterioration of their ballistocardiograms in the immediate postoperative period.[51]

48. Nickerson.[28a] Starr and Mayock.[29] Starr and Schroeder.[36]

49. Nickerson.[28a] Starr and Schroeder.[33]

50. Grob, D.; Scarborough, W. R.; Kattus, A. A., Jr., and Langford, H. G.: Further Observations on the Effects of Autonomic Blocking Agents in Patients with Hypertension: II. Hemodynamic, Ballistocardiographic and Electrocardiographic Effects of Hexamethonium and Pentamethonium, Circulation **8**: 352, 1953.

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55. Starr, I.: Clinical Studies on Incoordination of the Circulation as Determined by the Response to Arising, J. Clin. Invest. **22**: 813, 1943.

56. (*a*) Starr, I.: On the Later Development of Heart Disease in Apparently Healthy Persons with Abnormal Ballistocardiograms: 8 to 10 Year After-Histories of 90 Persons over 40 Years of Age, Am. J. M. Sc. **214**: 233, 1947. (*b*) Starr and Hildreth.[59]

### SPECIAL TESTS

There is every reason to think that myocardial abnormalities not detected at rest might be demonstrated by subjecting the heart to stress, and because of the ease of securing repeated observation, the ballistocardiograph is well suited to this purpose.[52] To test the effect of exercise on this record is possible to any physician possessing an instrument. In some clinics this is done routinely. There are however real difficulties with such a test.

Needless to say it is impossible to get a satisfactory ballistocardiogram during exercise, as impacts from muscular movements overwhelm the record. But it is not difficult to take a record as soon as the exercise itself is over, and long before its effect on the heart have subsided. But the patient just after exercise is hyperventilating, and he has been disturbed and may not lie quietly; both factors may cause artifacts in the record, which must be distinguished from abnormalities of cardiac contractions brought out by the exercise. When the Dock type of instrument is used in such a test, it must be set up again in a hurry after the exercise and errors of technique are easily made. I have no doubt that exercise tests are valuable and that they will bring out hidden cardiac abnormalities in many cases, but records taken soon after exercise are far more subject to artifacts than are resting records, so there is much to trip the unwary doctor. Let me repeat the rule, "No abnormality that is not regularly repeated is worthy of attention."

Tests of cardiac function during anoxemia[53] often yield interesting results, and, as the patient's position is unchanged while anoxemia is induced, artifacts are less likely to appear in the record than in tests made after exercise.

Deterioration of the record after smoking is so frequent in those with coronary heart disease diagnosed by the usual clinical criteria that one wonders whether this might not be properly used to aid in the identification of this condition.[54] Indeed, the responses of the heart to many drugs may well be developed into methods of testing for its functional capacity and limitations.

Tests comparing ballistocardiograms in the horizontal and vertical positions are full of interest, but abnormalities of the relationship occurs so often in sick persons of all kinds that the test has little discrimination.[55] But such tests give evidence of abnormal responses of the circulation in disease,[55] a field in which more information is greatly to be desired. This is a test of the circulation as a whole and not of the heart alone. Explanations for the abnormalities encountered is to be sought primarily in abnormalities of the vasomotor mechanisms, and both nervous and endocrine factors may play a part.

### LONG-TERM STUDIES

Our first records were taken in 1936. By 1939 we had assembled records from 200 healthy persons, almost 100 of whom have been retested 10 or more years later.[56] Some of them have remained healthy; others have not. In the latter the ballistocardiograms deteriorated as health declined. A patient with constrictive pericarditis was followed regularly up to the necropsy that took place 17 years after the first record. Many patients have been followed for shorter periods, and I have personnel especially engaged in follow-up work. Obviously the ex-

perience is too extensive to summarize here. But this long-term type of study will eventually provide decisive evidence of the value and utility of ballistocardiograms.

Especial interest has centered in the prognostic value of the record. I have many instances of healthy persons who, on reaching the age of about 60 years, have had abnormal records although they suffer from no symptoms suggestive of ill health. One wonders, of course, whether these older persons whose ballistocardiograms have become abnormal are those who will eventually have the characteristic picture of clinical coronary artery disease, and the long-term after-histories of such patients are of great interest. This is a field in which the last word has not yet been said; certainly in my small original series of patients,[56a] many of whom I have followed for 15 years, serious heart disease, often of the coronary type, has developed chiefly in those with ballistocardiograms of unusually small amplitude and in those whose records were abnormal in form. Many physicians have written or spoken to me of similar experiences. However, in my series, I have seen typical infarction develop in several patients who had had normal ballistocardiograms taken at rest. In one of these, the ballistocardiogram has steadily deteriorated but the one record taken before the first attack was altogether normal.[39] In another patient, normal ballistocardiograms taken at rest both preceded and followed a mild attack of coronary infarction, perhaps induced by most unusual exertion, as it occurred soon after a race at underwater swimming. Some years later the patient died suddenly without ever showing an abnormal record at rest, but it is of interest that even before the first attack the ballistocardiograms of this patient became abnormal after exercise.[39] In another patient, the cardiac infarction again followed most unusual exertion, occurring after the subject had climbed a mountain. The ballistocardiogram was found to be still normal after the accident, and recovery has been apparently complete and uneventful.

It is sobering to recall that physicians become rapidly aware of the untoward events that happen to their patients while, if patients continue in good health, this may not come to the physician's attention. My medical friends, finding that evidence of heart disease develops in a patient who, except for an abnormal ballistocardiogram, appeared to be in good health, are likely to write me about it. But patients who have continued in good health despite abnormal ballistocardiograms are much less likely to be brought to my attention.

I have quite a number of older persons in the series that I am following who, as age has advanced, have had ballistocardiograms abnormal in form, and in whom no evidence of any clinical form of heart disease has as yet developed.[39] Needless to say their future course will be followed with great interest. I am hopeful that such a study will go far to help us distinguish between the less and the more important types of abnormality, a field in which our information is very scanty at present.

## UTILITY OF THE BALLISTOCARDIOGRAM

Modern medicine may be dated from the beginnings of the descriptive school of thought, and under the aegis of this school the symptoms and signs of the various diseases were described. This school was followed by the great pathological school with its emphasis on the lesions found at necropsy. The chief concern was with the diagnosis of those aspects of disease that can easily be demonstrated at necropsy.

On the basis of the work of these two older schools, the advance guard of medical thought has now entered into a new orientation that might be called the physiological school, because of the increasing interest in the function of organs and in their response to the challenge of stress. Under the changing influence of these schools of thought, physicians have looked at the diagnosis of disease in different ways. For example, to those of the descriptive school, the diagnosis of pernicious anemia meant that the patient showed a group of signs and symptoms that conform to a typical pattern given that name; to those of the pathological school, the characteristic autopsy findings had the final word in the diagnosis of this disease; and to those of the physiological school the characteristic response to vitamin $B_{12}$ is looked on as the final criterion of diagnosis. Indeed to the physiological school belongs the credit for the great increase of interest in therapeutics that has been so characteristic of medicine in the United States in recent years, for the anatomic lesions that were the concern of the pathological school yielded little, if at all, to the therapy of that time, and there was a period when the leaders of medicine gave little serious attention to therapeutics, largely, I think, from the conviction that most diseases ran their course uninfluenced by therapy and so little could be done for patients besides nursing care and attention to their comfort. Medical attention was concentrated on the appearance of the heart as one held it in one's hand at the necropsy table, and most of the diagnoses written today in the hospital records stem from this viewpoint. The conception of the heart as a pump, performing its function of pumping the blood with an effectiveness that diminished in disease, the picture of the heart as producing energy, as performing work, or as beating strongly or weakly, conceptions that would at once come to an engineer concerned with a mechanical pump, did not concern those physicians of the pathological school, doubtless because they saw no way of getting knowledge on those points of a certainty that could be compared with the uncontrovertable structural abnormalities so often demonstrated at necropsy.

The ballistocardiograph is a physiological instrument designed to make readily available to clinicians information about certain fundamental aspects of the heart's function, especially its strength or weakness. Changes in cardiac function may or may not accompany the various anatomic and descriptive cardiac abnormalities that were the concern of the pathological and descriptive schools and that form the basis of most cardiac diagnoses made today. In my opinion little help will be gained from the ballistocardiogram in making cardiac diagnoses of the anatomic type. Those whose range of vision is limited to the conceptions of the past can be expected to see little virtue in the instrument. The information it gives is of a kind to which they are not accustomed.

Everyone having clinical experience with ballistocardiograms soon gets the impression that they permit distinctions not brought out by the usual clinical study avail-

able hitherto. A multitude of examples of this come to mind. In some cases of undoubted cardiac infarction myocardial function is hit hard [57]; in others, perhaps because the lesion is smaller, the resting record is not affected at all. Certainly such distinction seems well worth making, as do those concerned with the amount of myocardial recovery attained during convalescence from such accidents.[57] Similar distinctions can be made about cases of angina pectoris. In hyperthyroidism one gets the impression that myocardial involvement is more frequent than was suspected when the evidence was limited to the old criteria. In rheumatic heart disease, especially in young persons, one often is encouraged to find that myocardial function is normal despite valvular lesions. Elderly persons are sharply divided by ballistocardiographic findings. With the ballistocardiogram, the physician often gets a rather different impression of his patients. One does not use the ballistocardiogram to make well-known diagnosis with greater confidence but to gain additional information about the hearts of the patients.

Concepts such as cardiac fatigue, diminished cardiac reserve, myocardial weakness, and heart failure have been in the past speculations so vague that they have had little meaning. With the ballistocardiogram they at once acquire meaning; indeed, they have objective demonstration.

It is true that one may get some help in making anatomic diagnoses. In wide-open aortic regurgitation in a young person with good heart muscle the ballistocardiogram of great amplitude is very characteristic. Brown [14a] has called attention to the abnormality of the ballistic K wave, a shortening and delay found in cases of coarctation of the aorta, which returns to normal after the coarctation is surgically corrected. I have had similar cases, and, in thus relating the K wave to movement of blood in the aorta, Brown has made an important contribution to the interpretation of the record. Dr. E. W. Bixby, however, has shown me a ballistocardiogram lacking a K wave in which his diagnosis was patent ductus arteriosus, and indeed, after closure of the ductus by the surgeon the K wave returned to normal. It was not the anatomic lesions themselves, but their common physiological effect in reducing the flow of blood down the aorta—in one case flow was obstructed by the coarctation, in the other diverted into the pulmonary artery—that produced the similar abnormality of the ballistocardiogram.

While ballistic patterns have been described for hypertension [13b] and for mitral stenosis,[58] I feel sure that the sphygmomanometer and the stethoscope would be much more reliable for the diagnosis of these conditions. Here again a qualification must be made. What one hears by the stethoscope depends not only on the anatomic lesion but also on a physiological factor, the state of the circulation. Physicians have long known this in a general way, and the patient is exercised to bring out murmurs. Wenckebach once gave an address, the thesis of which was that if the circulation is hyperactive enough, the increased flow through a mitral valve of normal orifice might give murmurs suggestive of mitral stenosis. But I doubt whether the ordinary physician listening to the heart has any idea to what extent the physiological factors enter into the genesis of the sounds he hears.

I have had a striking example of the influence of such factors. A patient with myxedema who had the tiny ballistocardiogram characteristic of this condition lay in the ward for weeks, examined frequently by everyone from the chief down, without any cardiac abnormality being recognized. As the administered thyroid began to exert an effect, the first change in the ballistocardiogram occurred in records taken in the upright position, and for a period these had returned to normal amplitude although the records taken with the patient horizontal were still tiny. It was during this period that, in an examination made on the ward with the patient upright, the characteristic murmur of mitral stenosis was first heard, when the patient lay down it disappeared. Later when the thyroid exerted its full effect, records made in both positions became normal in size; and the murmur of mitral stenosis could be heard readily in any position. With knowledge of the amplitude of the ballistocardiogram before him, one is in a better position to give a correct interpretation of what he hears.

The ballistocardiogram will also aid in the interpretation of the blood pressure, for this pressure depends not only on the constriction of the peripheral vessels but also on the output of the heart. The ordinary case of essential hypertension in good condition shows a ballistocardiogram that is either normal or of small amplitude. In certain emotional states hypertension is accompanied by ballistocardiograms of large amplitude; thus, although the pressure readings may be similar, great differences in physiological mechanisms are disclosed. Interestingly enough, the same difference is seen between the responses of healthy subjects to epinephrine and arterenol [59]; although the rise of systolic blood pressure may be quite similar under the influence of both drugs, after administration of epinephrine the ballistocardiogram increases in size, after arterenol it diminishes.

An old teacher of mine, of extraordinary diagnostic acumen, used to take the position that there was no need for the department of medicine to teach therapeutics to the students, for once the diagnosis was correctly made the therapy followed as a matter of course. However, therapeutic agents have greatly increased in power; we know a good deal about what they will do in experimental animal preparations, though the effects are often more variable than most physicians realize; but we know less about what they do in healthy men and still less about their effects under the multifarious conditions of disease. They are two-edged swords and can cause harm as well as great benefit. The therapeutic instructions in textbooks reflect experience with the majority of patients, but the individual patient may react very differently for reasons not understood. The skilful physician seeks to recognize these differences in response to the therapeutic agents he employs.

The ballistocardiograph seems well suited to aid one in securing objective evidence of situations beneficial or harmful to the patient whose heart is suspected of being

57. Mandelbaum, H., and Mandelbaum, R. A.: Studies Using the Portable Electromagnetic Ballistocardiograph: IV. The Clinical Significance of Serial Ballistocardiograms Following Acute Myocardial Infarction, Circulation **7**: 910, 1953. Starr and Wood.[47]

58. Davis, F. W., Jr., and others: The Ballistocardiogram in Mitral Stenosis, Circulation **7**: 503, 1953.

59. Barcroft, H., and Starr, I.: Comparison of the Action of Adrenaline and Noradrenaline on the Cardiac Output of Man, Clin. Sc. **10**: 295, 1951.

abnormal. Thus digitalis causes extraordinary improvement in the records of some patients,[46] but in others marked deterioration of a previously normal record has followed its use.[48a] One wonders how often the busy physician accurately estimates the effect of this potent agent on the patient before him.

In some cases the effectiveness of therapy as judged by the ballistocardiogram surprises one. I recall a patient, who had syphilitic heart disease, in whom the improvement in the record after administration of penicillin and other therapeutic measures was spectacular.[12b] The small amplitude of the ballistocardiogram of a patient in a state of dehydration often returns to the normal size after the administration of fluids.[60] The improvement in ballistic form in cases of hyperthyroidism after antithyroid therapy is often most gratifying. The closure of an arteriovenous communication may have a striking effect.[61] The modern procedures of cardiac surgery, after the immediate effect of the stress of operation has passed off, often lead to gratifying improvement in the record. Thus, the ballistocardiogram will give objective evidence and so help to determine the effect of therapeutic agents on the patient.

As well as identifying situations that produce benefit, the physician must concern himself with those that cause harm, and the ballistocardiogram can also be used for this purpose. The deleterious effect of tobacco on the record, first observed in Dr. Dock's laboratory and now confirmed everywhere, came to me as a complete surprise. In healthy young persons smoking produces no effect on the record, but, in some persons beyond middle age, the temporary deterioration of the record produced by smoking one cigarette may reach a degree that suggests an incoordination of cardiac contraction similar to that seen when a patient subject to angina pectoris has a spontaneous attack on the table. During my own medical lifetime the deleterious effect of tobacco on peripheral vascular disease was detected, and I judge that its interdiction was an important feature in the improved prognosis of that disease, which has become so evident in recent years. Although the fact that tobacco would induce an attack of angina in certain subjects has long been known, the profession has had no way of detecting and has underestimated the deleterious effects that can occur in the absence of pain. These are very definite in most of those patients with the clinical picture of coronary heart disease, and one wonders whether the interdiction of smoking might not have as great a beneficial effect as in the closely related peripheral vascular diseases.[54]

The final judgment in this and many other matters relating to therapeutics must rest with the long-term observations of patients. During the dominance of the great pathological school, when the necropsy was the center of interest of those engaged in medical research, it was inevitable that such research largely should be confined to the great hospitals where necropsies could be conveniently carried out. Indeed, for the past generation the medical literature of importance has stemmed chiefly from hospital physicians of the consultant type. I look for the present physiological school of thought to derive its essential information largely from two sources: from experiments that are created and from the long-term following of cases in which the changing conditions of disease produce the experiment. In securing information of the latter type the hospital physician with a consulting practice is at a great disadvantage, for his contact with so many of his patients is unfortunately brief, and he is likely to see again only those who do poorly. I therefore expect that, to a degree not the case in the recent past, the family physician who has adopted the physiological viewpoint, working in a stable community and so in contact with his patients over long periods of time, will find himself in an unusually favorable position to provide us with decisive information on many matters of great importance to the patient.

854 Gates Memorial Pavilion, University Hospital (4).

60. Hardy, J. D., and Godfrey, L., Jr.: Effect of Intravenous Fluids on Dehydrated Patients and on Normal Subjects; Cardiac Output, Stroke Volume, Pulse Rate and Blood Pressure, J. A. M. A. **126**: 23 (Sept. 2) 1944.

61. Elkin, D. C., and Warren, J. V.: Arteriovenous Fistulas: Their Effect on Circulation, J. A. M. A. **134**: 1524 (Aug. 30) 1947.

# COUNCIL ON PHARMACY AND CHEMISTRY

*The following abstract of recent nomenclature decisions of the Council is authorized for publication.*

R. T. STORMONT, M.D., *Secretary.*

## NEW GENERIC AND BRAND NAMES RECOGNIZED BY THE COUNCIL

The Council collaborates with manufacturers in the selection of generic and brand names for marketed drug preparations presented for acceptance and also for new products still under development or clinical trial. The last report on such names appeared in THE JOURNAL, May 22, 1954, pages 362-363.

The following abstract lists the generic designation, the chemical name when necessary for information, and the brand name or names simultaneously recognized for the stated firms. In general, a generic name should bear recognizable relation to the chemical name and conform as closely as consistent with brevity and practicality to existing systems of scientific nomenclature. The chief requirement for a brand name is that it should not be therapeutically suggestive.

The listing of a brand name is not to be construed as indicating Council acceptance of the product itself. Products accepted for inclusion in New and Nonofficial Remedies are announced separately.

ACETYL SULFISOXAZOLE for $N_1$-acetyl-3,4-dimethyl-5-sulfanilamidoisoxazole: Gantrisin Acetyl (Hoffmann-LaRoche, Inc.)

AMODIAQUIN HYDROCHLORIDE for 4-(3′-diethylaminomethyl-4-hydroxyanilino)-7-chloroquinoline dihydrochloride: Camoquin Hydrochloride (Parke, Davis & Company)

CARZENIDE for *p*-carboxybenzenesulfonamide: Dirnate (Sharp & Dohme, Division of Merck & Co., Inc.)

DEXTRO-AMPHETAMINE SULFATE for dextro-α-methylphenethylamine sulfate: Dexedrine Sulfate (Smith, Kline & French Laboratories)

DIPHEMANIL METHYLSULFATE for N,N-dimethyl-4-piperidylidene-1,1-diphenylmethane methylsulfate: Prantal Methylsulfate (Schering Corporation)

FIBRINOGEN (HUMAN) for partially purified fibrinogen prepared by fractionation from normal human plasma: Parenogen (Cutter Laboratories)

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## THE CRUVEILHIER-BAUMGARTEN SYNDROME

Pegot, in 1833, observed a patient who on examination had dilated, tortuous veins on the abdominal wall with formation of a caput medusae and an audible murmur over the dilated veins on auscultation. Necropsy by Cruveilhier on the same patient in 1852 revealed a small noncirrhotic liver, a large spleen, and a patent umbilical vein. Cruveilhier considered the fundamental lesion in this case to be a congenital patency of the umbilical vein. This patency could be caused by the maintenance after birth of an abnormal communication between the umbilical vein and the epigastric veins. Such an anastomosis would permit the blood to be shunted away from the liver and lead to atrophy of the organ. In 1908 Baumgarten reported a somewhat similar case in a 16-year-old boy who died from massive gastric hemorrhage. There were distended abdominal veins, an enlarged spleen, ascites, and leukopenia. Necropsy revealed a small atrophic liver and a patent umbilical vein. Baumgarten suggested that in addition to the congenital patent umbilical vein, there was also a congenital hypoplasia of the portal system with a consequent hypoplasia of the liver. Hypoplasia of the portal system heightened the portal venous pressure, which then shunted the blood through a large patent umbilical vein to the systemic veins. What subsequently came to be designated as Cruveilhier-Baumgarten disease was characterized by evidence of excessive umbilical circulation and presence of a murmur and sometimes of a palpable thrill, with the usual evolution of portal hypertension leading to death.

Armstrong and his associates [1] in 1942 reviewed critically 52 cases culled from the literature, to which they added two of their own and one from the autopsy records of the Los Angeles County Hospital. Both patients observed by them presented the clinical picture of portal hypertension, in which a prominent feature was evidence of marked collateral circulation about the umbilicus, including venous hum and thrill. In one of the patients necropsy revealed a widely patent umbilical vein associated with an unusual type of fibrosis of the liver. They felt, on the basis of the study of the recorded cases and of their own two cases, that any patient having portal hypertension, generally with splenomegaly, visible veins, murmur, and thrill of excessive, prominent umbilical circulation, merited the diagnosis of Cruveilhier-Baumgarten syndrome. Those patients who at necropsy showed patency of the umbilical vein itself, together with atrophy and little or no fibrosis of the liver, should be considered as examples of Cruveilhier-Baumgarten disease. They also suggested that a clinical picture dependent on portal hypertension and associated with extensive umbilical collateral circulation could be produced by a variety of causative factors combined with a variety of anatomic arrangements of the umbilical circulation.

Jahnke and his associates,[2] in a recent communication, report four cases of the Cruveilhier-Baumgarten syndrome. They advanced the thought that the Baumgarten theory of hypoplasia of the portal system as the primary cause of the disease permitted a rational explanation of the sequence of the events that follow in these cases. The theory of portal hypoplasia could also be correlated with the hepatic atrophy reported in these patients. The small, but comparatively normal liver regarded by Cruveilhier and Baumgarten to be the result of atrophy or congenital hypoplasia may actually be an acquired hypoplasia secondary to a decreased portal blood flow. The entire disease then would be explained by one defect, namely, congenital hypoplasia of the portal system. Additional finding of a patent umbilical vein, portal hypertension, splenomegaly, and leukopenia could well be secondary effects. These authors also suggest that one may even visualize the hypoplasia of the hepatic veins creating an identical picture. In Dina and Martuzzi's [3] case of the Cruveilhier-Baumgarten syndrome a patent umbilical vein and hepatic veins with very small lumen were revealed at necropsy. There was hypoplasia of the liver with cirrhosis and phlebitis, persistence of patent umbilical, paraumbilical, and supraumbilical veins with caput medusae, marked hyperplastic and congestive splenomegaly, perihepatitis and perisplenitis, esophageal varices, and internal hemorrhoids. They advance the theory that the presence of a patent umbilical vein is caused by hypertension of the portal system that occurs very early, since it is well established that obliteration of the umbilical vein is complete five to eight weeks in postnatal life and since it is also well established that the umbilical vein cannot become recanalized after this period. On the basis of their histological studies they concluded that portal hypertension in patients with Cruveilhier-Baumgarten syndrome is caused by an obliteration of the intrahepatic branches of the portal vein. The primary cause of the syndrome is an intrahepatic phlebitis. Barneschi [4] concluded, on the basis of a careful histological study of a patient at necropsy, that the Cruveilhier-Baumgarten syndrome in the presence, as well as in the absence of a

1. Armstrong, E. L.; Adams, W. L. Jr.; Tragerman, L. J., and Townsend, E. W.: The Cruveilhier-Baumgarten Syndrome: Review of the Literature and Report of Two Additional Cases, Ann. Int. Med. **16**: 113-151 (Jan.) 1942.

2. Jahnke, E. J., Jr.; Palmer, E. D., and Brick, I. B.: The Cruveilhier-Baumgarten Syndrome: A Review and Report of Four Cases; Three Treated by Direct Portacaval Shunt, Ann. Surg. **140**: 44-55 (July) 1954.

3. Dina, M. A., and Martuzzi, M.: Spunti critici sulla persistenza della vena ombelicale nell'adulto; su la base di un caso di sindrome di Cruveilhier-Baumgarten, Minerva med. **2**: 947-955 (Dec. 5) 1951.

4. Barneschi, L.: Epicrisi di un caso di sindrome di Cruveilhier-Baumgarten quale contributo alla patologia delle vene sovraepatiche, Minerva med. **1**: 485-488 (May 19) 1947.

patent umbilical vein, belongs to a group of diseases caused by the obliteration of the hepatic veins.

The venous hum depends on the anastomoses between the portal and the systemic veins at the umbilicus or the xiphoid process. The hum is continuous in nature but may vary in intensity, being accentuated during systole, inspiration, or straining. Most authors believe that the murmur is caused by the passage of portal blood under increased pressure through the venous collaterals about the umbilicus and the abdominal wall. The murmur might also be produced at points of constriction in the course of a dilated and tortuous vein.

The prognosis of the condition, whether one calls it a syndrome or a disease, is poor, since it is essentially a case of portal hypertension, leading eventually to rupture of the esophageal varices and massive, fatal hematemesis or to liver decompensation, the second commonest cause of death in these cases. Splenectomy alone will relieve the condition of hypersplenism but not that of portal hypertension.

Kennedy and Rousselot [5] did a splenectomy and a splenorenal shunt in their patient, with an apparently good result. The four patients reported by Jahnke and others had dilated paraumbilical veins, but no patent umbilical vein could be found. Three of the patients were treated by a direct portacaval shunt.

The Cruveilhier-Baumgarten syndrome appears to represent only one stage in the history of portal hypertension in which the umbilical collateral circulation is excessively developed. Thus it has been suggested that, in the presence of normal liver function, the logical treatment would be some sort of a portal-systemic shunt, preferably the one between the portal vein and the vena cava.

## IS THERE A TRUE MALE CLIMACTERIC?

The rare syndrome called the male climacteric, which is defined in Dorland's Medical Dictionary as "the phenomena attending the normal decrease in sexual function in the male," is a much disputed term that has been the object of many claims and counterclaims. Briefly, the symptoms of the presumed entity include depression, irritability, loss of self confidence, sexual impotence, palpitation, lack of concentration, and weakness. A recent communication by Spence [1] points out that the male climacteric exists as a definite clinical entity for the following reasons: (1) similar symptoms occasionally occur in postpubertal castrates and eunuchoids and are improved by androgen therapy; (2) the 17-ketosteroid secretion, while by no means diagnostic of testicular insufficiency, tends to be low; (3) some of the symptoms of the male climacteric can be explained by lack of the anabolic action of testosterone; (4) the urinary excretion of gonadotrophin is raised—indicative of testicular but not necessarily of androgen insufficiency; (5) histological study of the testes may show structural changes; (6) symptoms are improved by androgen therapy but relapse when an inert substance is substituted; and finally, (7) arguments similar to those advanced against the concept of a male climacteric could be marshalled against the existence of a female climacteric, an entity that is widely accepted. Reiter [2] maintains that gonadotrophic hormone assays in the urine are of considerable import for the diagnosis and treatment of the male climacteric, while Heller and Myers [3] write that a differentiation of the male climacteric from psychogenic impotence can be made by means of urine gonadotrophic assays, which are elevated in the former and normal in the latter.

The claims advanced by advocates of the concept of a male climacteric, however, have been denied by other investigators unable to corroborate them. According to McCullagh,[4] the term male climacteric is a misnomer, in that it implies a physiological loss of power of production of sperm and internal secretion of the testes, which should be expected to occur at a fairly regular time of life in all men. Such a condition has not been shown to exist; however, there are some instances in which testicular failure appears in men past middle age and without evident cause—a functional hypogonadism. It is difficult to make a diagnosis of the male climacteric precisely because well-established diagnostic criteria have not been instituted. When a diagnosis of male climacteric has been made, subjective symptoms have usually been relied on.

Finally, Landau [5] declares that symptoms of the syndrome are probably due to a psychogenic disturbance. The use of the term male climacteric, he believes, implies that at some time between the ages of 40 and 60 a substantial proportion of normal men pass through a critical period of adjustment to a lowered titer of circulating androgen and that at this time symptoms similar to those following castration develop. There are many difficulties associated with quantitating the rate of secretion of male hormone. Landau and others assert that the beneficial effects sometimes attributed to injections of testosterone propionate are due to the influence of suggestion on emotionally unstable persons and that the term male climacteric should be abandoned.

From the foregoing it may be concluded that the so-called male climacteric is a rare condition, especially when a diagnosis is limited to persons who manifest objective disturbances analogous to those observed in women and in whom certain well-defined abnormalities can be demonstrated by objective laboratory procedures. Certainly, the promiscuous use of male hormone in patients showing psychogenically derived symptoms under the impression that these symptoms constitute a syndrome due to failure of sexual function is unwarranted and may prove harmful.

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5. Kennedy, R. J., and Rousselot, L. M.: The Cruveilhier-Baumgarten Syndrome: Report of a Case Treated by Combined Splenectomy and Spleno-Renal Shunt, Angiology **1**: 484-491 (Dec.) 1950.

1. Spence, A. W.: The Male Climacteric: Is It An Entity? Brit. M. J. **1**: 1355 (June 12) 1954.

2. Reiter, T.: General Practitioner's Forum: Treatment of the Male Climacteric by Combined Implantation, Practitioner **170**: 181 (Feb.) 1953.

3. Heller, C. G., and Myers, G. B.: The Male Climacteric, Its Symptomatology, Diagnosis and Treatment, J. A. M. A. **126**:472 (Oct. 21) 1944.

4. McCullagh, E. P.: Climacteric—Male and Female, Cleveland Clin. Quart. **13**:166 (July) 1946.

5. Landau, R. L.: The Concept of the Male Climacteric, M. Clin. North America **35**: 279 (Jan.) 1951.

# ORGANIZATION SECTION

## COUNCIL ON NATIONAL DEFENSE

*This is one of a series of brief statements explaining the work of various departments of the American Medical Association.* —ED.

The Council on National Defense was established by the House of Delegates in 1947 as the Council on National Emergency Medical Service to succeed the Committee on Military Medicine, which was created in 1945. The Council was charged with the responsibility for assisting the armed forces, as well as state and federal civil defense authorities, with medical and health problems and to act as a liaison with allied health agencies regarding personnel, facilities, and material needed in time of national emergency. It assists in planning for the distribution of medical and allied personnel in an all-out emergency, aids with national and state disaster relief plans, and coordinates the work of the state emergency medical service committees. The Council's activities in the field of emergency medical treatment helps physicians prepare themselves for the management and care of casualties that would result from an atomic, biological, or chemical attack. The Council also collects, prepares, and distributes general and technical information in this field for both military and civilian use. Governmental agencies, medical and hospital societies, and local disaster relief groups contact the Council for information and advice.

The Council works closely with the surgeons general of the armed forces and the Assistant Secretary of Defense (Health and Medical) in formulating plans and procedures designed to improve medical care for members of the armed forces. In this way, it also assists in insuring the most advantageous use of the country's medical manpower. The Council attempts to maintain a proper balance between the medical needs of the civilian population and the armed forces by working closely with the National Health Resources Advisory Committee, the National Medical Advisory Committee to the Selective Service System, and state medical advisory committees to Selective Service.

In addition to educating individual physicians as to their civil defense responsibilities, the Council assists state groups in medical civil defense planning. It accelerates the integration of the medical profession into national and local civil defense medical planning. It assists in formulating local emergency medical service plans and in surveying the special qualifications of individual physicians for use in the event of a national emergency.

In sponsoring an educational program on the medical aspects of civil defense, the Council maintains close and constant liaison with the Federal Civil Defense Administration and often works with established relief agencies, such as the American National Red Cross and industrial groups in planning disaster relief programs. The Council studies plans for procurement and distribution of personnel and reviews current emergency programs prepared by local medical groups. Special educational publications for specialized disaster personnel are prepared by the Council.

## USE BY BROADCASTERS OF FICTITIOUS MEDICAL PERSONNEL

Cooperation between the American Medical Association and the National Association of Radio and Television Broadcasters has resulted in better enforcement of that section of the NARTB Television Code regarding the use of fictitious medical personnel in paid advertising spots. The television code, which became effective March, 1952, provides that "when dramatized advertising material involves statements by doctors, dentists, nurses or other professional people, the material should be presented by members of such profession reciting actual experience or it should be made apparent from the presentation itself that the portrayal is dramatized. Complaints received by the A. M. A. indicated that many local TV broadcasters were violating this section of the code without interference. A. M. A. representatives met with members of the NARTB several times during 1953. As a result, the NARTB urged that networks and stations take great care when showing impersonations of doctors and other professional persons and instructed that a slide or audio announcement be made previous to or following the commercial, clearly indicating that the advertising was a dramatization.

In October, 1953, a letter was sent to executive secretaries of state and county medical societies by the A. M. A. Public Relations Department, requesting that local medical societies report violations of the TV code to the A. M. A. if they were unable to secure the cooperation of local broadcasters. The violations then would be discussed by the NARTB and A. M. A. representatives. This letter was accompanied by a reference copy of the NARTB Television Code. Since the end of last year there has been a noticeable decrease in the type of advertisements portraying professional persons in connection with a product endorsement. Dr. George F. Lull and Leo Brown represented the A. M. A. at the annual convention of the NARTB in Chicago in May.

## WEST VIRGINIA STATE MEDICAL ASSOCIATION

On April 10, 1867, less than four years after West Virginia was admitted as the 35th state of the Union, the Medical Society of West Virginia (now West Virginia State Medical Association) was organized at a meeting held in Fairmont. The official call for the meeting was signed by 16 physicians practicing in West Virginia: 7 in Wheeling, 3 in Clarksburg, 2 in Triadelphia, and 1 each in Buckhannon, Fairmont, Grafton, and Morgantown. The following is a verbatim copy of the first two paragraphs of the call: "As a means of elevating the standard of Practical Medicine and Surgery in West Virginia—and to render quackery odious, as it deserves, the want of State Medical Organization is severely felt by all true cultivators of our noble science within the limits of the State. In West Virginia, the profession is, at many points, adorned by one or more active intelligent members, who, by their industry and devotion to science, have made for themselves a name outside of their fields of labor; and there are others, too, of modest talent, scattered here and there, who but require the contact and association which a proper organization would so surely effect, to develop latent powers and capabilities of great credit to themselves, individually, and beneficial, in the highest degree, to their patients and the commonwealth of medicine." It was stated: "The call is urged upon all members of the regular profession, and their presence in the proposed convention is earnestly solicited."

At the first meeting in Fairmont 22 physicians were present, all from northern West Virginia, geographical barriers doubtless preventing those from "South of the Kanawha" from attending. The Baltimore and Ohio Railroad Company, out of "respect for the legitimate profession of medicine and surgery," carried physicians to and from their destination without charge. In his presidential address, Dr. John Frissell of Wheeling, first president of the organization, discussed the vast changes brought about by the steam engine, the telegraph, and the speed with which travel was then accomplished.

In 1869 the new organization initiated a program for legislation to require registration of births, marriages, and deaths. A bill providing for such registration was enacted by the legislature in 1921. The original main objectives of the society included establishment of a state board of health and regulation of the practice of medicine and surgery, both of which were attained in 1881 when a bill to establish a state board of health and to regulate the practice of medicine and surgery was passed by the legislature. At that time Dr. Andrew R. Barbee of Point Pleasant, who was president of the society in 1876, was a member of the West Virginia Senate. He afterward served as head of the West Virginia Department of Health. While Dr. Henry D. Hatfield, who is still in active practice in Huntington, was serving as governor of West Virginia (1913), one of the outstanding aims of his administration became a reality with enactment of the West Virginia Workman's Compensation Law.

The Workman's Compensation Fund, which now administers the law, constitutes one of the most important achievements of organized medicine in the state.

Until 1902, while the organization functioned as the Medical Society of West Virginia, the reports of meetings were published in the "Transactions of the Medical Society of the State of West Virginia." The first issue of the *West Virginia Medical Journal* appeared in 1906. Originally a quarterly publication, it became a monthly in 1907 and has been published continuously as such since that time. It is the official organ of the state medical association. The late Dr. James R. Bloss of Huntington served as its editor from 1906 to 1926 and from 1927 through 1937, when he was named editor emeritus. Dr. Walter E. Vest, also of Huntington, has served as editor since 1937.

The association includes 28 component societies separated into six councilor districts that parallel closely the lines of the six congressional districts in the state. Meetings of most of the societies are held monthly except during July and August. The council is composed of two members from each district, together with the officers of the association, including the president, two vice-presidents, treasurer, chairman of the council, and the councilor-at-large. The American Medical Association Delegates and

The Atlas Building in Charleston, in which the headquarters of the West Virginia State Medical Association are located.

Alternates and the state director of health are invited to sit in at all meetings of the council. Permanent state headquarters offices were opened in 1925 in Charleston, with Mr. Sterrett O. Neale, Huntington, in charge. West Virginia was the fourth state in the nation to employ a lay executive secretary, and but three persons have held the office, Mr. Neale, Mr. Joe W. Savage, now with King Features, Inc., New York, and the present executive secretary, Mr. Charles Lively. Offices, first housed in the Public Library Building, were moved in 1941 to the present location, the Atlas Building, 1031 Quarrier St. The office staff is composed of three members, including the executive secretary.

During the past 10 years, the principal activities of the association have included a state-wide campaign for support against the threat of socialized medicine, conducted under the leadership of Dr. Frank J. Holroyd, Princeton, president of the association in 1951 and an A. M. A. Delegate from West Virginia since 1952. The public relations committee, which has also functioned as a committee on rural health, has sponsored five annual press-radio conferences, usually attended by slightly more than 100 representatives of the press, radio, and television, with several members of the committee and officers of the association. The idea for a doctor-press-radio code of ethics was developed at one of these conferences, and the present code was adopted in 1951 by the West Virginia Newspaper Council, the West Virginia Broadcasters Association, and the West Virginia State Medical Association. As a result of rural health conferences, held annually since 1948, rural families have been enrolled in medical and hospital service plans in at least 15 counties, and interest has been developed in the creation of health councils and construction of health centers.

The woman's auxiliary to the West Virginia State Medical Association, composed of more than 1,100 members in 24 local auxiliaries, has played a prominent part in the fight against socialized medicine and in practically all the other activities of the association. For several years the association has vigorously advocated construction and maintenance of a four year school of medicine. Work has now started at Morgantown on the school, which will be part of West Virginia University. It is expected that the school will be completed during the summer of 1956.

The membership of the association has grown steadily. At present there are 1,475 members, an all-time high, including about 150 honorary members. The officers serving during the current year are: president, Dr. Russell Kessel, Charleston; first vice-president, Dr. George F. Evans, Clarksburg; second vice-president, Dr. James L. Patterson, Logan; treasurer, Dr. T. Maxfield Barber, Charleston; and executive secretary, Mr. Lively of Charleston, who serves also as managing editor and business manager of the *West Virginia Medical Journal*. The association will hold its annual meeting at The Greenbrier, White Sulphur Springs, Aug. 19-21.

## STANDARD NOMENCLATURE OF DISEASES AND OPERATIONS—FOURTH EDITION

The Editorial Advisory Board of the Standard Nomenclature of Diseases and Operations has requested that from time to time in the interim between editions, probably biannually, a list of additions and deletions or other changes that are made in coding and classification be printed in THE JOURNAL. We are, therefore, listing below the changes that have been made since publication of the fourth edition, in January, 1952. The changes listed have been individually approved by the nomenclature committees that cover each section of the book, and changes listed in the International equivalents have been approved by the head statistician, Division of Public Health Methods, U. S. Public Health Service, Washington, D. C.

It is suggested that each user of the Standard Nomenclature add this list as an attachment to the present volume and in the case of institutions where many books are in use that they obtain the list in reprint form. Reprints of this material (in the present Nomenclature page and type size) will be available through the office of Standard Nomenclature at cost price.

RICHARD J. PLUNKETT, M.D., Editor
ADALINE C. HAYDEN, R.R.L., Associate Editor

### STANDARD NOMENCLATURE OF DISEASES AND OPERATIONS, FOURTH EDITION, ADDITIONS AND CHANGES

#### SCHEMA OF CLASSIFICATION

#### TOPOGRAPHIC CLASSIFICATION

#### ADDITIONS

| Page | Code | Region |
|---|---|---|
| 4 | 0431 | Epigastric region |
| | 0441 | Umbilical region |
| | 0442 | Lumbar region |
| | 0451 | Hypogastric region |
| | 0561 | Lumbovertebral area |
| | 0581 | Sacral area |
| | 0582 | Coccygeal area |
| 5 | 070 | Supraclavicular fossa |
| 10 | 2281 | Manubrium |
| | 2282 | Body |
| | 2283 | Ensiform process |
| | 23133 | Styloid process |
| 14 | 2561 | Subscapular bursa |
| 17 | 27619 | Coracobrachialis |
| | 27620 | Subclavius |
| 21 | 3531 | Bronchioles of upper lobe of right lung |
| | 3532 | Bronchioles of middle lobe of right lung |
| | 3533 | Bronchioles of lower lobe of right lung |
| | 3534 | Bronchioles of upper lobe of left lung |
| | 3535 | Bronchioles of lower lobe of left lung |
| 22 | 3631 | Apical segments |
| | 3632 | Anterior segments |

| Page | Code | Region |
|---|---|---|
| | 3633 | Posterior segments |
| | 3641 | Medial segments |
| | 3642 | Lateral segments |
| | 3651 | Superior segments |
| | 3652 | Anterior basal segments |
| | 3653 | Posterior basal segments |
| | 3654 | Lateral basal segments |
| | 3655 | Medial basal segments |
| | 3662 | Anterior segments, upper division |
| | 3663 | Apical posterior segments, upper division |
| | 3664 | Superior segments, lower division |
| | 3665 | Inferior segments, lower division |
| | 3671 | Superior segments |
| | 3672 | Anterior-medial basal segments |
| | 3673 | Posterior basal segments |
| | 3674 | Lateral basal segments |
| | 400 | Cardiovascular system, generally |
| | 40231 | Pulmonary vein and subclavian artery |
| | 40232 | Splenic artery and vein |
| | 40233 | Coronary sinus and systemic arterial circulation |
| | 40234 | Visceral pericardium and mitral valve |
| 23 | 4065 | Pulmonary vein and left auricle |
| | 4066 | Pulmonary vein and right auricle |
| | 4067 | Inferior vena cava and left auricle |
| | 409 | Omentum and myocardium |
| | 4171 | Auricular appendage |
| | 423 | Pericardial cavity |
| 27 | 6005 | Esophagus and ileum |
| 31 | 7044 | Urethra and perineum |
| | 7051 | Vagina and cervix |
| | 7076 | Ureter and ileum |
| 33 | 7561 | Appendix of epididymis |
| 35 | 820 | Parathyroid gland, generally |
| | 830 | Thymus gland, generally |
| | 850 | Pineal gland, generally |
| | 890 | Carotid gland, generally |
| 44 | x129 | Epithelium |

## ETIOLOGIC CLASSIFICATION

### ADDITIONS

| Page | Code | Category |
|---|---|---|
| 53 | 1577 | Toxoplasma |
| 55 | 2182 | Cryptococcus capsulatum |
| 78 | 8...9 | Neoplasm with ulceration |

### DELETION

| | | |
|---|---|---|
| 78 | 899 | Cancer, tumor, neoplasm, etc. |

## NOMENCLATURE OF DISEASES

### ADDITIONS

| Page | Code | Standard Diagnosis | International Equivalent |
|---|---|---|---|
| 101 | ...-0.. | Anomaly, congenital. Specify site and anomaly | (759.3) * |
| 106 | ...-639 | Herniation of.... Specify site | (795.0) * |
| 115 | 110-5x0 | Dermatitis hypostatica; purpuric lichenoid dermatitis | (716) |
| 119 | 145-9x6 | Erythroplasia of Queyrat, penis | (617) |
| | 116-9x6 | Cutis hyperelastica | (710.5) |
| 144 | 24x1-4x0.0 | Bunion | (740) |
| 164 | 330-776 | Acromegaly affecting larynx | (272) |
| 176 | 360-9x0 | Hyaline membrane of lung | (527.2) |
| 183 | 456-013 | Fibroelastosis of endocardium congenital | (754.4) |
| 190 | 420-511.0 | Pericarditis due to myocardial infarction | (420.1) |
| 191 | 420-930 | Acute benign pericarditis | (434.3) |
| 196 | 46.-5x4.4 | Embolism of....from thrombus. Specify artery | (454) * |
| 204 | 48.-615 | Phlebolith of.... Specify vein | (467.2) |
| 209 | 501-991.4 | Hereditary ovalocytosis | (299) |
| 214 | 55.-130 | Non-bacterial regional lymphadenitis (Cat scratch fever). Specify lymph node | (694) * |
| 226 | 6133-016 | Dentinogenesis imperfecta (opalescent dentine) | (583.5) |
| 227 | 613-418 | Fracture of tooth crown | (873.2) |
| 273 | 68.-611 | Obstruction due to foreign body in bile passage. Specify passage | (586) * |
| 281 | 067-9x7 | Idiopathic spontaneous infarction of omentum | (570.2) |
| 290 | 710-8034 | Cholesteatoma of kidney | (219) |
| 294 | 723-854A | Lymphangioma of ureter | (228) |
| 315 | 7561-637 | Torsion of appendix epididymis due to unknown cause | (617) |
| 326 | 764-1x0.6 | Granuloma of prostate | (611) |
| 327 | 767-641 | Varicosities of intrinsic vessels of prostate | (462.2) |
| 328 | 764-830 | Lymphosarcoma of prostate. Specify behavior | (200.1) |
| | 764-8012 | Mucinous carcinoma of prostate. Specify behavior | (177) |
| 331 | 740-012 | Hypospadias in female | (757.2) |
| 343 | 786-415.4 | Scar of uterus, following operation (633) | (999.4) |
| 359 | 7x2-0041 | Pregnancy (uterine) delivered prematurely, twins | (660.6) * |
| 360 | 7x2-003 | Pregnancy (uterine) delivered immaturely, living child | (660.6) * |
| | 7x2-008 | Pregnancy (uterine) delivered immaturely (antepartum or intrapartum death) | (650.0) * |
| 361 | 790-001 | Immature birth, neonatal death (y21) * | (778.5) * |
| | 790-002 | Immature birth, living child (776 *; to count, y21) | |
| | 7x2-007 | Premature delivery, neonatal death | (660.6) * |
| | 7x21-007 | Term delivery, neonatal death | (660.6) * |

### SUPPLEMENTARY TERMS

#### ADDITIONS

| Page | Code | Standard Supplementary Term | International Equivalent |
|---|---|---|---|
| 491 | 327 | Respiratory insufficiency | (795.0) |
| 493 | 403 | Coronary insufficiency | (420.1) * |
| | 496 | Stenosis of tricuspid valve | (412) * |
| | 497 | Stenosis of pulmonary valve | (421.3) * |
| | 498 | Stenosis of mitral valve | (410) * |
| | 499 | Stenosis of aortic valve | (421.1) * |
| | 437 | Right bundle branch block | (433.0) |
| | 438 | Left bundle branch block | (433.0) |
| 494 | 5x0 | Fibrogenopenia | (296) * |
| 495 | 57x | Galactemia | (788.9) * |
| | 565 | Galactosemia | (788.9) * |
| | 568 | Globulinemia | (788.9) * |
| | 59x | Hypernatremia | (788.9) * |
| | 538 | Hypernitremia | (788.9) * |
| | 56x | Hypoglobulinemia | (788.9) * |
| | 599 | Hyponatremia | (788.9) * |
| | 539 | Hyponitremia | (788.9) * |
| 498 | 718 | Galacturia | (789.9) * |

## NOMENCLATURE OF DISEASES

### CHANGES

| Page | Code | Standard Diagnosis | Should Be Changed to |
|---|---|---|---|
| 96 | 011-3312 | Ethyl alcohol (chronic) | 011-33122 |
| | 010-3314 | Ethylene | 010-3343 |
| 97 | 019-11x | Antitetanus | 019-119 |
| 98 | 010-576 | Sea sickness; car sickness | Motion sickness; air; car; sea |
| 103 | ...-415.x | Abscess of... following operation | Absence of... following operation |
| | ...-400.xx | Absence of... due to trauma | -400.x |
| 109 | 130-)<br>13x-) | Regions of skin | 130-)<br>149-) |
| 114 | 110-390 | Urticaria papulosa | 11x-3901 |
| 118 | 13.-8024A | Papilloma of skin. Specify region | 13.-814A |
| 129 | 2x13-41..<br>2x23-41.. | Fracture, Colles'<br>Fracture, Potts' | 2x12-41..<br>2x22-41.. |
| 136 | 2290-100 | Chondritis, purulent, of costal cartilage | 2291-100 |
| 138 | 26x-424 | Toe, hammer | 26x-434 |
| 144 | 25.-4x6.9 | Chronic bursitis of... with calcification. Specify bursa | 25.-4x0.9 |
| 149 | 275-037.9 | Esophageal hiatus (diaphragmatic hernia), congenital | 2751-027 |
| 153 | 300- | Respiratory System | 30- |
| 156 | 310-8024A<br>318-8024A | Adenomatous polyp of nose<br>Adenomatous polyp of nasal pharynx | 310-8023A<br>318-8023A |
| 159 | 32.-400.0 | Granuloma of sinus due to trauma. Specify sinus | 32.-400.6 |
| 167 | 330-441.9 | Ulceration of trachea due to burn from heat | 340-441.9 |
| 168 | 359-<br>306- | Bronchi and skin of thorax<br>Bronchi and pleura | 3053-<br>3051- |
| 172 | 360-1236 | Tuberculoma of lung, primary | 361-1236 |
| 175 | 360-600.4 | Atelectasis of lung due to foreign body in bronchus | 360-611.4 |
| 177 | 377-<br>306- | Pleura and thoracic wall<br>Bronchi and pleura | 3074-<br>3051- |
| 195 | 46.-100.7 | Hemorrhage from artery due to infection. Specify artery | 46.-100.5 |
| 226 | 6144-100.0<br>614-100.2 | Apical granuloma<br>Dental fistula | 6144-100.6<br>614-100.3 |
| 256 | 666-630 | Intussusception of colon | 660-630 |
| 260 | 7088-100.3 | Fistula, rectovesical due to infection | 7085-100.3 |
| 261 | 7088-415.3<br>7088-400.3 | Rectovesical fistula following operation<br>Rectovesical fistula due to trauma | 7085-415.3<br>7085-400.3 |
| 262 | 70x2-959 | Endometriosis of rectovaginal septum | 70x21-959 |
| 264 | 60x-641<br>60x-631 | Hemorrhoids, internal and/or external<br>Hemorrhoids, internal and/or external prolapsed | 67x-641<br>67x-631 |
| | 60x-619 | Hemorrhoids, thrombosed | 67x-619 |
| 267 | 680-330 | Diffuse degeneration of liver (hepatitis) due to carbon tetrachloride | 680-33411 |
| 284 | 469-190 | Periarteritis nodosa of mesenteric artery | 469-931 |
| | 469-190.7 | Thrombosis of mesenteric artery due to periarteritis nodosa | 469-931.7 |
| 285 | 7033-029 | Abnormal communication between uterus and bladder | 7032-029 |
| 297 | 7034-100.3<br>7033-100.3<br>7032-100.3 | Fistula, vesical, into seminal vesicle<br>Fistula, vesicouterine, due to infection<br>Fistula, vesicovaginal, due to infection | 7033-100.3<br>7032-100.3<br>7031-100.3 |

| Page | Code | Standard Diagnosis | Should Be Changed to |
|---|---|---|---|
| 298 | 708-415.3 | Fistula, vesicoabdominal, following operation | 7302-415.3 |
| 299 | 73x-6x6 | Varix of bladder | 73x-641 |
| 305 | 743-415.3 | Fistula, urethroperineal, following operation | 7044-415.3 |
| 313 | 755-8071 | Adenocarcinoma of testis. Specify behavior | 755-8091 |
| 332 | 70x0-100.3 | Fistula, rectolabial, due to infection | 70x4-100.3 |
| 336 | 781-100.9 | Dyspareunia due to infection | 781-100.x |
| 337 | 70x2-412 | Tear of rectovaginal septum | 70x21-412 |
| 346 | 782-8096A | Myoma of uterus (fibroid) | 782-866A |
| 354 | 047-412 | Laceration of pelvic floor (old) complete | 047-4122 |
| 357 | 7032-412.3 | Vesicovaginal fistula, obstetric | 7031-412.3 |
| 359 | 7x42-789 | Pregnancy in rudimentary horn | 7x22-789 |
| 361 | 790-911 | Lithopedion | 7x2-911 |
| | 790-9x9 | Fetus papyraceus | 7x2-9x9 |
| | 7990-019 | Patent vitelline duct (omphalomesenteric duct) | 7991-0.9 |
| 363 | 7x51-614 | Retention of placenta and membranes | 7941-614 |
| 373 | 846- | Craniobuccal (Rathke's) pouch | 845- |
| | 846-600.8 | Cyst of craniobuccal (Rathke's) pouch, non-neoplastic | 845-600.8 |
| 377 | 860-8021A | Feminizing adenoma of adrenal gland | 860-8051A |
| 387 | 911.-4x7 | Acute subdural hematoma of.... Specify region | 913.-4x7 |
| 388 | 911.-4x6 | Subdural hematoma, chronic (internal hemorrhagic pachymeningopathy) of.... due to trauma. Specify region | 913.-4x6 |
| 392 | 9y3-050 | Birth injury of brain, unlocalized | 93y-050 |
| 407 | 907-11x.9 | Toxic radiculomyelopathy due to Clostridium tetani | 907-119.9 |
| 409 | 970.64-4x4 | Adhesions of cauda equina due to trauma | 97844-4x4 |
| 423 | x11-415.1 | Absence of eyeball following operation | x11-415.x |
| | x11-410 | Penetrating wound of eyeball | x11-4111 |
| 428 | x12-410 | Wound of cornea, penetrating | x12-4111 |
| 438 | x20-014.6 | Retrolental fibroplasia | x23-014.6 |
| 439 | x20-400.1 | Aphakia due to trauma | x20-400.x |
| | x20-415.1 | Aphakia following operation | x20-415.x |
| 442 | x22-4x9 | Hernia of vitreous into anterior chamber due to trauma | x22-400.9 |
| | x22-410 | Penetrating wound of vitreous | x22-4111 |
| 484 | 011-332 | Alcoholic intoxication (simple drunkenness) | 011-3312 |
| | 7x4-y01 | Died undelivered | 7x2-y01 |
| | ...-899D | Neoplasm, nonspecific, of.... | Delete |

## CHANGES IN INTERNATIONAL EQUIVALENTS

| Page | Code | | Change |
|---|---|---|---|
| 137 | 2531-409 | Detachment of medial meniscus of knee | (836.0) to (844.0)* |
| | 2532-412 | Tear of lateral meniscus of knee | (836.0) to (844.0)* |
| 147 | 27.-514 | Contracture of.... due to ischemia | (995.8)-add asterisk |
| 154 | 3181-100.8 | Cyst of pharyngeal bursas | (210) to (517) |
| 156 | 318-600.8 | Cyst of nasopharynx | (212)* to (517) |
| 157 | x00-x10 | Anosmia due to unknown cause | (781.7) to (781.4) |
| 508 | x41 | Anosmia | (781.7) to (781.4) |
| 164 | 331-600.8 | Cyst of epiglottis | (212) to (517) |
| | 330-600.8 | Cyst of larynx | (212) to (517) |
| 189 | 410-402.x | Cardiac arrest | (434.3) to (433.0) |
| 266 | 680-100 | Acute hepatitis due to infection | (582) to (580.0) |
| | 680-151 | Amebic hepatitis | (046.1) to (046.0) |
| | 680-100.0 | Chronic hepatitis | (581.0)-add asterisk |
| 269 | 680-911 | Acute or subacute yellow atrophy | (580) to (580.1) |
| | 680-915 | Acute diffuse hepatic necrosis | (580) to (580.1) |
| 298 | 730-4x9 | Cystocele | (606)* to (631) |
| 400 | 930-x03 | Convulsive state, myoclonic type | (780.2) to (353.3) |
| | 930-x06 | Status convulsivus | (780.2) to (353.2) |
| 401 | 930-x12 | Akinetic seizure | (780.2) to (353.3) |
| | 930-x50 | Narcolepsy | (780.7) to (355) |
| 409 | 978..-409 | Avulsion of.... nerve roots. Specify region | (958.2)* to (959.2)* |
| | 970..-43. | Compression, chronic, of spinal cord at.... Specify region and agent | (356.0) to (357) |
| | 970..-4362 | Compression of spinal cord at.... by scar tissue. Specify region | (356.0) (958.9)* to (357) (958.9)* |
| | 970..-4361 | Compression of spinal cord at.... by callus. Specify region | (356.0) (806.9) to (357) (806.9) |
| | 970-438 | Compression of spinal cord at.... by foreign body. Specify region | (356.0) to (357) |
| 410 | 978..-403 | Compression, acute, of.... nerve roots. Specify roots | (958.0)* to (959.0)* |
| | 978..-43. | Compression, chronic, of.... nerve roots by.... Specify region and agent as for Spinal cord, preceding | (357) to (368) |
| | 978..-435 | Compression of nerve roots by hypertrophied ligamentum flavum. Specify region | (357) to (738) |
| | 978..-402 | Contusion of.... nerve roots. Specify region | (958.0)* to (959.0)* |
| | 978..-412 | Laceration of nerve roots. Specify region | (958.0)* to (959.0)* |
| | 978..-410 | Wound of.... nerve roots. Specify region | (958.2)* to (959.2)* |
| 412 | 978..-y10 | Radiculopathy of.... due to undetermined cause. Specify region and whether condition is dorsal or ventral | (366) to (368) |
| 415 | 98..-050 | Birth injury: laceration of.... Specify nerve | (760.0)* to (761.0)* |
| 493 | 411 | Sinus arrest | (433.1) to (433.0) |

Make changes in Appendix, pages 852-1034, according to this list.

## CHANGES AND ADDITIONAL NOTES IN APPENDIX

| Page | Title | |
|---|---|---|
| 861 | 046.1 | Delete 680-151; enter in 046.0 |
| 884 | 210 | Delete 3181-100.8; enter in 517 |
| | 212 | Delete 318-600.8; 330-600.8; and 331-600.8; enter all in 517 |
| 930 | 433.1 | Delete 411; enter in 433.0 |
| | 434.3 | Delete 410-402.x; enter in 433.0 |
| 933 | 460 | Delete 110-5x0; enter in 716 |
| 949 | 580 | Change 580 to read: Acute hepatitis and atrophy of liver. Add to note under 580: *Excludes* these conditions if specified as infectious or viral (092); spirochetal (072); amebic (046); due to serum (997, 998.5); or any other specified organism, poisoning or injury |
| | | Add 580.0 Acute hepatitis<br>580.1 Acute and subacute yellow atrophy of liver |
| | | Place 680-911 and 680-915 under 580.1 |
| 950 | 582 | Delete 680-100; enter in 580.0 |
| 974 | 734 | Add to note: Includes chronic or old sprains, strains, dislocations, or old unspecified injury of knee (joint) (ligament) (cartilage). |
| | 736 | Add to note: Includes affections (old) (chronic) (post-traumatic NOS) of lumbosacral joint or region, and of back, NOS. |
| 990 | | Add as fourth paragraph to present note under XVI. Symptoms, Senility and Ill-defined Conditions: The above applies particularly in single cause tabulations. In morbidity research projects, titles 780-795 may be coded as secondary or supplementary to a specific diagnosis coded elsewhere if they add desired and significant information. |
| | 780.2 | Delete 930-x06; enter in 353.2, delete asterisks; delete 930-x03 and 930-x12; enter in 353.3 |
| 991 | 780.7 | Delete 930-x50; enter in 355 |
| 992 | 781.7 | Delete x00-x10 and x41; enter in 781.4 |
| 997 | 788.9 | Add note: Results of laboratory blood tests, such as hyperglycemia, hypoglycemia, hypocalcemia, decrease in amino-acids, etc., now coded to 260, 270, 286.6 or 289, on pages 494, 495 in Section 5, Supplementary Terms, should be coded to this title if a definite diagnosis has not been established. Abnormal blood constituents known to be due to any condition in 250-299, or to any other cause, should be coded to the cause specified, only. This title adds little as a secondary code. |
| | | Abnormal blood constituents, treated as ill-defined diagnoses in Vol. II of International, have been indexed to the most probable or most frequent underlying cause. |
| 998 | 789.9 | Add note: This title excludes cystinuria, galactosuria, melanuria, and other urinary conditions when known to be due to chronic or inborn defects of metabolism, or to any other cause. Results of laboratory tests of urine now coded to 016, 199.1. 203,289.2, 603 (as the most likely underlying causes) on pages 498, 499, Section 7, Supplementary Terms, should be coded to this title if a definite diagnosis has not been established. |
| 1005 | 836.0 | Add note: Excludes chronic or old dislocation of knee (734). |
| | | Delete 2531-409 and 2532-412; enter in 844.0. |
| | | Add two asterisks after title. |
| | 844.0 | Add note: *Includes* rupture or tear of cartilage or ligament unless dislocation (836) is specified. *Excludes* chronic or old sprains, strains of knee (joint) (cartilage) (ligament) (734). |
| | 846 | Change present note to read: Includes current sprain, strain of lumbosacral joint or region, and current injury of unspecified nature of these sites. Excludes old or chronic strain or old injury NOS of lumbosacral joint or region (736). |
| 1006 | 847 | Add note: Includes current injury of unspecified nature, without evidence of spinal cord injury, of back NOS; excludes old or chronic sprains or strains, or old injury NOS, of back NOS (736). |

**Note:** In a few instances, the International equivalent code used for a Standard term may differ from the code for the same or a similar term as indexed in Vol. 2 of the International Statistical Classification. Some of these differences are due to the fact that the present standard code or terminology used for a given term may supply additional information that changes the International equivalent.

In a few cases, after cross-checking and comparison, the International code, as indexed in Vol. 2, is considered to be in error. Comments and suggestions as to these differences or to any international code or coding method used in integrating the Standard and the International classifications, may be addressed to Dr. Selwyn D. Collins, Head Statistician, Division of Public Health Methods, U. S. Public Health Service, Department of Health, Education and Welfare, Washington 25, D. C. or to his assistant, Mrs. Louise E. Bollo, Nosologist for the Division.

# MEDICAL NEWS

## CALIFORNIA

**Cleft Palate Clinic.**—The University of California College of Dentistry at the Medical Center, San Francisco, has initiated a cleft palate consultation for children, under the direction of Charles S. Lipp, D.D.S., Oakland, associate professor in the college of dentistry. Family dentists and physicians may refer their cleft palate patients for evaluation of mouth defects, and parents can bring their children directly to the clinic for consultation. Information may be obtained from Dr. Lipp, College of Dentistry, University of California, San Francisco 22.

**Faculty Retirements.**—Three faculty members at the University of California medical center, San Francisco, retired July 1. Dr. Karl F. Meyer, D.V.M., Ph.D., LL.D., director of the Hooper Foundation since 1921, has been affiliated with the university since 1913. He is credited with developing methods of controlling botulism when it threatened the California canning industry 30 years ago, and he also played a major role in the control of plague, brucellosis, psittacosis, encephalitis, tick fever, mussel poisoning, and leptospirosis. Dr. Robert Wartenberg, clinical professor of neurology, came to the University of California Medical School in 1936. He has developed or simplified many tests for physicians to use in diagnosing neurological diseases, and his books in this field have been translated into many languages. Dr. Michael Hobmaier, D.V.M., associate professor of comparative pathology, who came to the Hooper Foundation in 1930, is an authority on a number of infectious agents, including lungworm, trichinella, and the agent of hoof-and-mouth disease.

## IOWA

**Medical History in Polk County.**—The Polk County Medical Society announces publication of "The History of Medicine of Polk County, Iowa," by Dr. Walter L. Bierring, Des Moines, a past president of the American Medical Association, who is chairman of the society's historical committee. The medical history begins with the establishment of the first white settlement at the fork of the Des Moines and Raccoon rivers, Oct. 11, 1845. The book includes 144 pages and an index of physicians, hospitals, medical journals, and associations. Complimentary copies will be placed in the Des Moines city library, the library of the Iowa State Medical Society, and other established medical libraries on request. A limited number of copies have been printed. Price of the book is $4.

## ILLINOIS

**State Medical Election.**—At the annual meeting of the Illinois State Medical Society Dr. F. Garm Norbury, Jacksonville, was chosen president-elect; Dr. Louis R. Limarzi, Chicago, first vice-president; Dr. James C. Redington, Galesburg, second vice-president; and Dr. Harold M. Camp, Monmouth, secretary-treasurer for the 30th time. Dr. Arkell M. Vaughn, Chicago, was installed as president.

### Chicago

**Gift to Medical School.**—The University of Illinois College of Medicine has received the private bookcases of Dr. Oliver Wendell Holmes as a gift from Dr. and Mrs. Bernard Appel of Lynn, Mass.

**Hospital News.**—The Michael Reese Alumni Association has elected Dr. Theodore M. Shapira, president; Dr. Herman J. Smith, Des Moines, Iowa, vice-president; Dr. Bernard M. Cohen, secretary; and Dr. Gerald J. Menaker, treasurer. All officers except Dr. Smith are from Chicago.——Dr. Erich M. Uhlmann, director of the tumor clinic at Michael Reese Hospital, is in charge of the 45 million volt linear accelerator, said to be the first apparatus of this type ever constructed for medical purposes. Dr. Uhlmann started his experimental studies on free electrons in 1928 with energies of 250,000 watts. The basic principle consists of the acceleration of electrons on a linear basis rather than in an orbit, as in a betatron (for light particles) or a cyclotron (for heavy particles). The linear accelerator of Michael Reese Hospital was constructed on the pattern of the projected one billion volt apparatus developed in the microwave laboratory of Stanford University in Palo Alto, Calif., and certain essential parts of this apparatus were procured from the university. The building, which for protective purposes contains 3 ft. thick walls of reinforced concrete and houses the machine, a patient's treatment room, a control room, and laboratory facilities, was constructed during the second half of 1953 at a cost of $100,000. The entire project represents an investment of about $300,000, financed by private contributions.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education and public health. Programs should be received at least three weeks before the date of meeting.

## KANSAS

**Appoint Professor of Pediatrics.**—The Mercy Hospital professor of pediatrics chair, newly created at the University of Kansas School of Medicine, Kansas City, has been occupied since July 1 by Dr. Daniel C. Darrow, who had been affiliated with the department of pediatrics, Yale University School of Medicine, New Haven, Conn., since 1928 and served as professor of pediatrics since 1947. Dr. Darrow, who was given the Borden award by the American Academy of Pediatrics in 1951, was invited by the French government to deliver a series of lectures in a symposium on potassium therapy in Paris, France, in June and July.

## MARYLAND

**State Medical Election.**—Newly elected officers of the Medical and Chirurgical Faculty of the State of Maryland include: Dr. George H. Yeager, Baltimore, president; Drs. Waldo B. Moyers, Hyattsville, Samuel Whitehouse, Baltimore, and Charles J. Foley, Havre de Grace, vice-presidents; Dr. Everett S. Diggs, Baltimore, secretary; and Dr. J. Albert Chatard, Baltimore, treasurer.

**Dr. Kanner Honored.**—At its annual dinner at the Hotel Astor, New York, the Association for the Help of Retarded Children presented its annual award to Dr. Leo Kanner, associate professor of psychiatry, Johns Hopkins University School of Medicine, Baltimore, for his contributions on behalf of the mentally retarded. In 1930 Dr. Kanner established at the Johns Hopkins Hospital the first children's psychiatric unit in connection with the pediatrics department, which has become an international teaching center in child psychiatry. He is also professor of pediatrics at McCoy College, Baltimore, the adult education unit of Johns Hopkins University, and has been visiting lecturer at the universities of Michigan, Minnesota, Nebraska, and Texas, at Dalhousie University, and at Goucher College. Dr. Kanner is on the board of examiners for the American Board of Psychiatry and Neurology.

## MASSACHUSETTS

**Institute of Psychiatric Treatment.**—This institute, under the direction of Dr. Leo Alexander and Dr. Robert E. Arnot, will be held Sept. 1 to 3 at the reception building of the Boston State Hospital. Subjects for discussion will be "Treatment of Manic-Depressive Illness," "Treatment of Schizophrenia," and "Treatment of Psychoneuroses and Borderline States." The registration fee is $35. Hotel reservations may be obtained by writing Parker House, Boston, where rooms have been set aside for those attending the institute. All communications concerning the institute should be addressed to 433 Marlborough St., Boston.

## MONTANA

**Surgical Meeting in Great Falls.**—The Montana chapter of the American College of Surgeons will hold its annual meeting in Great Falls on Aug. 28. The guest speakers will be Drs. H. Glenn Bell, professor of surgery, University of California Medical School, Berkeley-San Francisco; Russell R. deAlvarez, professor of obstetrics and gynecology, University of Washington School of Medicine, Seattle; and H. Prather Saunders, Chicago, associate director of the American College of Surgeons. All physicians are invited to attend the scientific sessions and the annual banquet.

## NEVADA

**Surgical Conference.**—The fifth annual conference of the Reno Surgical Society will convene at the Riverside Hotel in Reno, Aug. 19 to 21. Guest speakers and their first presentations include:

Brian B. Blades, Washington, D. C.: Lung Tumors.
Norman E. Freeman, San Francisco: Recent Advances in the Diagnosis and Treatment of Obliterative Arterial Disease.
Leland S. McKittrick, Brookline, Mass.: Surgery in the Diabetic Patient.
Rupert B. Raney, Los Angeles: Early Diagnosis of Brain Tumors.
Ralph G. Rigby, Salt Lake City: Diagnosis and Treatment of Foreign Objects in the Respiratory and Upper Gastrointestinal Tract.
John B. deC. M. Saunders, San Francisco: Surgical Anatomy of the Shoulder Joint.
Albert M. Snell, Palo Alto, Calif.: Ulcerative Colitis.
Donald G. Tollefson, Los Angeles: Subsequent Cesarean Section.
Robert M. Zolinger, Columbus, Ohio: Techniques Used in Gastrointestinal Surgery.

Judge Charles Merrill, Nevada Supreme Court, will address a luncheon meeting Thursday in the Sky Room, Hotel Mapes. Other social events include a cocktail party at Roaring Camp, Harolds Club, Thursday night, and lunch at the Riverside Hotel, Friday, in the Theater Restaurant and dinner in the Redwood Room. A special program has been planned for the ladies. For reservations, address Dr. James R. Herz, Secretary, Reno Surgical Society, 508 Humboldt St., Reno.

## NEW YORK

**Albert D. Kaiser Medal to Dr. Morton.**—The Rochester Academy of Medicine recently bestowed on Dr. John Jamieson Morton Jr. its highest award, the Albert David Kaiser medal for 1954. Dr. Morton served as surgeon-in-chief at Strong Memorial Hospital in Rochester from 1924 to 1953, when he became professor of surgery, emeritus, and acting director of cancer research. He is now on a government mission to Japan to aid in the study of the effects of atomic radiation.

**Personal.**—Dr. David E. Bigwood Jr., Utica, city health officer, has been appointed health commissioner of the city of Syracuse to succeed Dr. Clealand A. Sargent, now Binghamton city health officer.——Dr. Earle G. Brown, Minneola, Nassau County health commissioner since 1938, was recently selected by the Kansas Public Health Association as the 1954 recipient of the Samuel J. Crumbine award for his contributions to the health of the people of Kansas. Dr. Brown served as city health officer of Topeka from May, 1919, to June, 1925, when he became Kansas State Health Officer.——Dr. Martin M. Maliner, Brooklyn, assistant clinical professor in pediatrics at the Post-Graduate Medical School of the New York University-Bellevue Medical Center, delivered two lectures on the differential diagnosis of congenital heart disease in children at the ninth Spanish Congress of Pediatrics in Santiago, Spain, July 4 to 8.——The Rochester Academy of Medicine has awarded a certificate of merit to Dr. William A. Sawyer, Rochester, for many years medical director of Eastman Kodak Co. The citation reads, in part: "We honor you, Dr. Sawyer, for your distinguished achievements in industrial medicine, and for your notable and devoted service to the health of the community and nation."

### New York City

**University News.**—Dr. Benton Davis King, formerly assistant chief of anesthesia at the Brooke Army Hospital, Fort Sam Houston, San Antonio, Texas, has been made associate professor of anesthesiology at the State University College of Medicine at New York City, Brooklyn.——Dr. Saul Krugman has been appointed associate professor of pediatrics at New York University-Bellevue Medical Center's college of medicine, where he has been an instructor in pediatrics since 1948.

**Hardy Memorial Research Fund.**—As a memorial to the late Dr. Le Grand H. Hardy, clinical professor of ophthalmology, Columbia University College of Physicians and Surgeons, and attending ophthalmologist at the Vanderbilt Clinic and the Presbyterian Hospital, where he was director of the Knapp Memorial Laboratory of Physiologic Optics in the Institute of Ophthalmology, a fund is being established for furthering research. Contributions may be sent to the Hardy Memorial Research Fund, Institute of Ophthalmology, 635 W. 165th St., New York 32.

## NORTH CAROLINA

**Cruise Conference for General Practitioners.**—The North Carolina Academy of General Practice will hold its annual meeting Oct. 16 to 22 aboard the S. S. Stockholm, a transatlantic liner that will leave Morehead City Oct. 16 at 2 p. m. and arrive in Havana, Cuba, Oct. 18 at 1 p. m. and in Nassau in the Bahamas Oct. 20, 8 a. m. The cruise is not limited to members of the academy. Information may be obtained from Dr. John R. Bender, Executive Secretary, 310 W. Fourth St., Winston-Salem.

## OKLAHOMA

**Medicolegal Institute.**—The Oklahoma Bar Association, the Oklahoma State Medical Association, and the College of Law of the University of Oklahoma sponsored a medicolegal institute at the University of Oklahoma, July 8 and 9. The program, designed to acquaint members of both professions with the practices and problems of each other insofar as they relate to the judicial process, included discussions of the physician's role in the administration of justice, the preparation of medical testimony, the techniques in presenting medical evidence, the hypothetical question, and similar topics. Edwin J. Holman, LL.B., of the A. M. A. Law Department, participated in the program.

## OREGON

**Dr. Seaman Wins Fulbright Fellowship.**—Dr. Arthur J. Seaman, associate professor of experimental medicine, University of Oregon Medical School, Portland, has been awarded a Fulbright fellowship for study and research during the 1954-1955 academic year at the University of Oslo, Norway, where, under Dr. Paul Owren, professor of medicine, he will develop a project on blood coagulation, particularly the body mechanism that initiates blood clotting. During the fifth International Congress of the International Society of Hematology at the Sorbonne in Paris, Sept. 6 to 12, Dr. Seaman will present a paper on the development and length of life of normal and leukemic white blood cells, prepared by Drs. Seaman, Edwin E. Osgood, and Harold Tivey and Demetrios A. Rigas, Ph.D.

## PENNSYLVANIA

**Examinations for Public Health Offices.**—The Commonwealth of Pennsylvania on Sept. 11 will hold examinations for chief, division of cancer control; director of professional training; medical coordinator (Civil Defense); public health educator; chief, division of infant and pre-school health; chief, division of statistical methods; state regional medical director; state district medical director; chief of social services (alcoholism); senior psychiatric social worker (alcoholism); and psychiatric social worker (alcoholism). The salary range is $5,058 to $12,108. A notarized application for civil service examination must be submitted before Aug. 20. Applications may be obtained from the State Civil Service Commission, Temporary Building 3, Capitol Park, Harrisburg.

### Pittsburgh

**University Building Program.**—The University of Pittsburgh has begun construction of two multimillion-dollar buildings, part of one of the largest university expansion programs in the United States. Construction of the 10-story, 15 million dollar building for the schools of the health professions and the $2,500,000 George Hubbard Clapp hall for science was in-

augurated with ground-breaking ceremonies held during the week of June 28. The new structure for the schools of the health professions will house the schools of medicine, dentistry, pharmacy, and nursing. George Hubbard Clapp Hall, which will establish a new axis to the university's lower campus, will house undergraduate teaching and research in the natural sciences. A million-dollar engineering building connecting two existing campus buildings is already under construction. The university's $4,500,000 medical center residence for nurses was completed in April, 1953. Plans are under way for a student union building and dormitories for men and women and a new 5 million dollar building for the graduate school of public health.

## TEXAS

**State Medical Election.**—At the annual meeting of the Texas Medical Association in San Antonio, Dr. Francis J. L. Blasingame, Wharton, succeeded to the presidency. Dr. Joel L. Cochran, San Antonio, was chosen president-elect and Dr. James C. Terrell, Stephenville, vice-president. The 1955 annual session will be held in Fort Worth, April 25 to 27.

**University News.**—The University of Texas Medical Branch, Galveston, with the assistance and cooperation of the Josiah Macy Jr. Foundation, recently held a three day conference on medical and psychological team work in the care of the chronically ill, under the chairmanship of Molly R. Harrower, Ph.D., New York, and Dr. Paul E. Holbrook, Ashland, Ky., with Dr. Frank Fremont-Smith, New York, representing the Josiah Macy Jr. Foundation and Chauncey D. Leake, Ph.D., executive director, representing the medical branch.——The legislature of the state of Texas in special session recently appropriated $3,500,000 to meet the additional building needs of Southwestern Medical School of the University of Texas. This money will be used primarily to provide teaching and research facilities for the clinical science departments. In addition, there will be some expansion of basic science department facilities and provision of animal, hospital, and general research facilities.

## VERMONT

**Medico-Dental Golf Tournament.**—The 19th annual Medico-Dental Golf Tournament will be played at the Rutland Country Club Aug. 16, beginning at 1:30 p. m. Dr. William S. Dempsey, St. Albans, last year won the tournament with a low gross score of 76 in St. Johnsbury. Physicians and dentists from over the state will be welcome to attend the dinner at 6:30 p. m. if unable to come for the tournament. Reservations should be made with Mr. Getty Page, 128 Merchants Row, Rutland.

## WEST VIRGINIA

**Human Rabies.**—According to the Public Health Service, preliminary information has been received on human rabies in a young boy who had been bitten by a dog about four weeks before death. An examination of the brain of the dog was reported positive for Negri bodies. The child was not given antirabies vaccine immediately after being bitten.

**Honorary Life Members.**—The following physicians were recently elected to honorary life membership in the West Virginia State Medical Association: James L. Cunningham, Pickens; Decatur Montoney, Elkins; George W. Wyatt, Dryfork; Joseph A. Guthrie and George D. Johnson, Huntington; Worth B. Forman, Buckhannon; Grover C. Corder, Jane Lew; Henry C. Skaggs, Montgomery; Robert W. Dailey, Romney; and Erland H. Hedrick, Beckley.

## WISCONSIN

**Essay Contests.**—Two prizes of $100 and $50 are offered by the Medical Society of Milwaukee County for the two best scientific essays submitted for the 1954 Anthony J. Gramling Memorial essay contest. All submitted papers either written or published during the calendar year 1954 by eligible contestants will be considered. Eligible for this contest are all house officers of accredited hospitals in Milwaukee County and all members in good standing of the Medical Society of Milwaukee County who have been graduated from medical school not longer than 10 years, excluding any period of active military service. Manuscripts, double spaced, must be submitted in triplicate by Dec. 31 to the Committee on Scientific Research of the Medical Society of Milwaukee County, 208 E. Wisconsin Ave., Milwaukee 2. Awards will be made at the May, 1955, meeting of the medical society.——The Milwaukee Academy of Medicine offers two prizes of $100 and $50 for the two best scientific essays in any field of medicine, surgery, or the allied specialties. The essays need not represent original investigation but should represent individual work and must not have been previously published. The contest is open to all physicians who have been graduated from medical school within the last 10 years and who are residing in the state of Wisconsin or who are in the armed forces at the time the essay is submitted. Physicians who have been discharged from the armed forces and who have been graduated for more than 10 years may submit essays if deduction of their period of service will bring them within the 10 year period following graduation from medical school. All essays must be double spaced and submitted in triplicate to the office of the Academy of Medicine, 561 N. 15th St., Milwaukee 3, before Dec. 1. Awards will be presented at the annual meeting of the academy.——The Milwaukee Academy of Medicine and the Rogers Memorial Sanitarium, Oconomowoc, offer prizes of $200 and $100 for the two most meritorious studies in the fields of neurology, psychiatry, and psychosomatic medicine. The contest is open to all members of the medical profession who are citizens of the state of Wisconsin, whether they are actually in residence or not, and to those who, not ordinarily residents of the state, are stationed in Wisconsin in the armed forces. All papers must be submitted in triplicate and double spaced to the office of the Academy of Medicine, 561 N. 15th St., Milwaukee 3, not later than Dec. 1. Awards will be presented at the annual meeting of the academy.

## HAWAII

**Society News.**—Officers of the Hawaii Medical Association include: Dr. Nils P. Larsen, Honolulu, president; Dr. Clarence E. Fronk, Honolulu, president-elect; Drs. Clarence M. Burgess, Honolulu, Toshio Kutsunai, Hilo, Harold S. Kushi, Kahului, Maui, and Peter Kim, Kealia, Kauai, vice-presidents; Dr. Samuel L. Yee, Honolulu, secretary; and Dr. Thomas H. Richert, Honolulu, treasurer.

**Rehabilitation Center in Honolulu.**—In August, 1950, the Oahu Health Council began a study of the problem of rehabilitation in Honolulu at the request of the National Society for Crippled Children and Adults, the Vocational Rehabilitation Bureau, the Oahu Tuberculosis and Health Association, the Department of Public Welfare, and the Bureau of Sight Conservation. In February, 1953, with the financial assistance of the public health committee of the Chamber of Commerce, the council's rehabilitation committee brought Dr. Howard A. Rusk from New York for consultations and lectures on rehabilitation, after which Kauikeolani Children's Hospital, Honolulu, offered ground, buildings, and such ancillary services as laundry, kitchen, laboratory, and x-ray facilities. The Rehabilitation Center of Hawaii, which opened Sept. 15, 1953, now has 18 ward beds and facilities for handling 50 outpatients daily. Equipment is available for occupational, physical, speech, hearing, and play therapies. According to the *Hawaii Medical Journal*, a number of dramatically successful rehabilitation projects have been carried near to completion, such as making a paraplegic patient, totally bedridden for 12 years in a local hospital, almost entirely self-sufficient at the wheel-chair level and a quadriplegic patient, helpless for 13 years, self-supporting (in a wheel-chair) writing radio and television scripts. A large placement committee of local citizens assists the center in finding work at which the center's alumni can become at least partially self-supporting. The formation of the center has been a community-wide effort in which government and private agencies cooperated. The journal gives credit to the National Foundation for Infantile Paralysis for generous financial support at the outset, to Children's Hospital for the timely offer of essential physical facilities, and to the 13 physicians who donated their professional services to the institution.

## GENERAL

**Abstracts for Federation for Clinical Research.**—The midwestern section of the American Federation for Clinical Research, which will hold its annual meeting Oct. 28 at the Northwestern University medical campus in Chicago, announces that abstracts of not over 300 words, in quintuplicate and postmarked not later than Sept. 4, should be sent to Dr. William W. Stead, Veterans Administration Hospital, 54th St. and 48th Ave. South, Minneapolis 17.

**Reduction in Traffic Deaths.**—The National Safety Council reports a 6% reduction in traffic deaths during the first half of 1954. There were 16,300 traffic deaths in the first six months of this year, as compared with 17,250 in the corresponding period of 1953. Of 498 reporting cities, 199 had fewer deaths at the halfway point, 156 had more deaths, and 143 reported no change. No-death records were reported by 119 cities, the three largest being Berkeley, Calif. (113,800), Richmond, Calif. (99,500), and Topeka, Kan. (78,800).

**Magazine on Noise Control.**—The Acoustical Society of America, which recently celebrated its 25th anniversary, will launch a bimonthly semitechnical publication, *Noise Control*, in November. According to Leo L. Beranek, Sc.D., of the Massachusetts Institute of Technology, Cambridge, president of the society, the periodical will be devoted to exchange of information on research, health, legal aspects, employer liability, and news. Information and subscriptions can be obtained by writing to *Noise Control*, 57 E. 55 St., New York 22.

**American Psychosomatic Society.**—This society will hold its 12th annual meeting at the Claridge Hotel in Atlantic City, N. J., May 4 to 5, 1955. This meeting will be immediately preceded by those of the American Society for Clinical Investigation and the Association of American Physicians and will be followed by the meeting of the American Psychoanalytic Association. The program committee would like to receive titles and abstracts of papers (20 minute time limit) for consideration for the program no later than Dec. 1. The committee is interested in (1) investigations in the theory and practice of psychosomatic medicine as applied to adults and children in all the medical specialties and (2) contributions in psychophysiology and ecology. Abstracts should be submitted in duplicate to the chairman, Dr. Lawrence S. Kubie, 551 Madison Ave., New York 22.

**National Foundation Awards.**—The National Foundation for Infantile Paralysis has announced the award of grants and appropriations totaling $2,486,244, effective July 1, for research ($1,506,418) and professional education ($980,096) in poliomyelitis and related fields in 30 medical schools, universities, hospitals, research institutions, and educational organizations in the United States and 2 in other countries. These new awards bring to a total of 74 million dollars the money provided in March of Dimes funds since 1938 for research in virology and epidemiology, prevention and treatment of after-effects of poliomyelitis, clinical studies of medical care problems, poliomyelitis prevention, and aid to professional and public education. In addition, from 1938 up to this year, the national foundation has expended an additional $174,700,000 in meeting costs of treatment for patients needing help.

**Society News.**—At the annual meeting of the **Society for Vascular Surgery,** June 20, in San Francisco, Dr. Robert R. Linton, Boston, was elected president; Dr. Keith S. Grimson, Durham, N. C., vice-president; Dr. George D. Lilly, Miami, Fla., secretary; Dr. Frank L. A. Gerbode, San Francisco, recorder; and Dr. George H. Yeager, Baltimore, treasurer. The next meeting of the society will be held June 5, 1955, in Atlantic City, N. J. ——Newly elected officers of the **American Medical Women's Association** include: Dr. Camille Mermod, Newark, N. J., president; Dr. Esther C. Marting, Cincinnati, president-elect; Dr. Elizabeth A. Kittredge, Washington, D. C., first vice-president; Dr. Edith Petrie Brown, Bedford, Ohio, second vice-president; Dr. Elizabeth H. R. Fischer, Chicago, treasurer; Dr. Mary Margaret Frazer, Detroit, assistant treasurer; Dr. Carye-Belle Henle, Newark, N. J., recording secretary; and Dr. Rebecca McF. Rhoads, Wynnewood, Pa., corresponding secretary.

**Whitney Opportunity Fellowships.**—The John Hay Whitney Foundation, 630 Fifth Ave., New York 20, has announced awards totaling $100,000 in Opportunity fellowships to 48 persons in 17 states and three territories. The fellowships, designed to furnish opportunity to Americans to advance their education and develop their special talents, are awarded "to young persons who show exceptional promise and who have been prevented by race, cultural background, economic status, or region of residence from fully developing their potentialities." Awards for the continuation of the study of medicine were made to two students at the University of Oklahoma School of Medicine, Oklahoma City, and one each at the University of Louisville (Ky.) School of Medicine, University of Colorado School of Medicine, Denver, Southwestern Medical School of the University of Texas, Dallas, and the University of North Dakota School of Medicine, Grand Forks. One award was made to a student at the Ohio State University College of Medicine, Columbus, to begin internship at Philadelphia General Hospital.

**World Congress of Cardiology.**—The second World Congress of Cardiology and the 27th annual scientific session of the American Heart Association will convene jointly, Sept. 12 to 17, in Washington, D. C. The sessions will open Monday, 9 a. m., with the presentation of "International Cardiovascular Epidemiology" by Dr. Paul D. White, Boston. Symposiums are scheduled on atherosclerosis; clinical value of instrumental methods of diagnosis in congenital heart disease (to the exclusion of roentgenography and electrocardiography); the problems of circulation; blood volume; physiology of the contractile protein in heart muscle; and vectorcardiography. The following panels have been scheduled:

- Congenital Heart Disease: Indications for and Results of Operations in Patent Ductus Arteriosus, Coarctation of the Aorta, Pure Pulmonic Stenosis, and Tetralogy of Fallot
- Diagnosis and Management of Rheumatic Fever and Rheumatic Heart Disease
- Treatment of Hypertension
- Surgery of Congenital Heart Disease
- Surgery of Noncongenital Heart Disease
- Electrocardiography
- Ballistocardiography

Tuesday at 11:30 a. m. the George Brown Memorial lecture, "Control of the Peripheral Circulation by the Walls of the Blood Vessels," will be delivered by Dr. Alan C. Burton, London, Ontario, Canada. At 3:30 p. m. Drs. Manuel Rene Malinow, D. Hojman, and A. A. Pellegrino, Buenos Aires, will present "Methods for the Experimental Production of Generalized Atherosclerosis in the Rat," the Paul White prize lecture of the Argentine Society of Cardiology. Closing remarks will be made at 12 noon Thursday by Drs. Charles Laubry, Paris, France, and Paul D. White, Boston, after delivery of the Charles Laubry lecture, "Leadership in Cardiology," by Sir John Parkinson, London, England. The reception for congress members will be held at the Pan American Building Sunday evening. A formal banquet, held simultaneously at the Mayflower and Statler hotels Tuesday evening, will feature the presentation of the 1954 Howard W. Blakeslee awards of the American Heart Association (THE JOURNAL, July 31, page 1266). Medical sightseeing tours are planned for Wednesday and Friday afternoons to institutions of scientific interest in the Washington area. There will be a concert by the National Symphony Orchestra of Washington Thursday. Postcongress tours to leading university centers and cardiac clinics of the United States and Canada have been organized. The tours, which will last about two weeks, will include visits to Washington, Baltimore, Philadelphia, New York, and Boston, with optional extension to Montreal, Toronto, and Niagara Falls.

**National Association of Coroners.**—This group will hold its annual meeting at the Marion Hotel, Little Rock, Ark., Aug. 16 to 19, under the presidency of Dr. Robert A. Evans, Columbus, Ohio. Dr. Walter A. Ostendorf, regional flight surgeon, Civil Aeronautics Administration, Fort Worth, Texas, will discuss "Aviation Medicine and the Prevention of Aircraft Accidents" Monday, 11 a. m. Monday afternoon a panel discussion will follow the presentation of "Poison Problems Past and Present: Helpful Postmortem Signs" by Dr. Lloyd D. Seager, University

of Arkansas School of Medicine, Little Rock. The Tuesday session will open at 9:30 a. m. with a panel discussion, "Determining Mode and Manner of Death: Suicide, Homicide, Accident, or Natural Causes?" The role of the pathologist will be presented by Dr. Anderson Nettleship, Little Rock, Ark., and the role of the coroner by Dr. Willis P. Butler, Shreveport, La., while the Hon. Lindsey Hatchett, director of Arkansas state police, will describe the role of the police. Among other presentations will be the functions and services of the Federal Bureau of Investigation laboratory by Briggs J. White, F.B.I. Laboratory in Washington, and "The Polygraph and Interrogation" by Dr. Herbert Lyle, Cincinnati, Hamilton County, Ohio. At the banquet the Hon. Ellis Fagan, dean of the Arkansas Senate, will be master of ceremonies. Dr. R. B. Robins, Camden, Ark., a past vice-president of the American Medical Association, will be principal speaker.

**Prevalence of Poliomyelitis.**—According to the National Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United States and its territories and possessions in the weeks ended as indicated:

| Area | July 17, 1954: Paralytic Type | July 17, 1954: Total Cases Reported | July 18, 1953, Total |
|---|---|---|---|
| **New England States** | | | |
| Maine | 1 | 1 | 5 |
| New Hampshire | .. | .. | 5 |
| Vermont | .. | .. | .. |
| Massachusetts | 5 | 9 | 14 |
| Rhode Island | .. | .. | 3 |
| Connecticut | 4 | 10 | 15 |
| **Middle Atlantic States** | | | |
| New York | 9 | 27 | 103 |
| New Jersey | 12 | 21 | 26 |
| Pennsylvania | .. | 12 | 35 |
| **East North Central States** | | | |
| Ohio | 14 | 51 | 62 |
| Indiana | 4 | 11 | 22 |
| Illinois | 19 | 34 | 72 |
| Michigan | 23 | 54 | 62 |
| Wisconsin | .. | 3 | 9 |
| **West North Central States** | | | |
| Minnesota | 1 | 6 | 46 |
| Iowa | 18 | 47 | 10 |
| Missouri | 9 | 17 | 42 |
| North Dakota | .. | 3 | 1 |
| South Dakota | .. | 6 | 4 |
| Nebraska | 15 | 33 | 13 |
| Kansas | 7 | 30 | 20 |
| **South Atlantic States** | | | |
| Delaware | 2 | 2 | .. |
| Maryland | 5 | 6 | 22 |
| District of Columbia | 1 | 4 | 3 |
| Virginia | 4 | 13 | 55 |
| West Virginia | 4 | 6 | 14 |
| North Carolina | 5 | 13 | 88 |
| South Carolina | 11 | 21 | 11 |
| Georgia | 10 | 34 | 24 |
| Florida | 18 | 59 | 25 |
| **East South Central States** | | | |
| Kentucky | 17 | 25 | 25 |
| Tennessee | 4 | 24 | 62 |
| Alabama | 2 | 12 | 29 |
| Mississippi | 5 | 32 | 21 |
| **West South Central States** | | | |
| Arkansas | 6 | 13 | 19 |
| Louisiana | 22 | 37 | 23 |
| Oklahoma | 16 | 51 | 30 |
| Texas | 54 | 140 | 86 |
| **Mountain States** | | | |
| Montana | .. | .. | 11 |
| Idaho | .. | 1 | .. |
| Wyoming | .. | 9 | 2 |
| Colorado | 1 | 7 | 4 |
| New Mexico | 5 | 9 | 8 |
| Arizona | 6 | 20 | 7 |
| Utah | .. | 1 | 10 |
| Nevada | .. | 2 | 3 |
| **Pacific States** | | | |
| Washington | 4 | 12 | 8 |
| Oregon | 3 | 6 | 4 |
| California | 73 | 122 | 82 |
| **Territories and Possessions** | | | |
| Alaska | 3 | 6 | 5 |
| Hawaii | 3 | 3 | 1 |
| Puerto Rico | .. | .. | .. |
| Total | 425 | 1,065 | 1,251 |

## CANADA

**Society for the Study of Fertility.**—The Canadian Society for the Study of Fertility will hold its first annual meeting at the Windsor Hotel, Montreal, Sept. 30 to Oct. 2. The meetings are open to all physicians interested. The registration fee is $10. Inquiries should be addressed to Dr. R. J. McDonald, Secretary, C.S.S.F., Woodstock, Ontario.

**Personal.**—Dr. G. Earle Wight, M.C., C.M., O.B.E., Montreal, has been appointed chief of medical services for the Canadian Pacific Railway to succeed the late Major Gen. C. P. Fenwick, C.B., C.B.E., M.C., E.D., F.A.M., F.A.C.S., wartime director-general of medical services for the Canadian Army. As chief of the Canadian Pacific Railway's medical services, Dr. Wight will direct the work of 8 district medical officers and 375 part-time medical officers through the dominion.

**Canadian Association Appoints New General Secretary.**—Dr. Arthur D. Kelly, Toronto, deputy director of RCAF medical services, has been appointed general secretary of the Canadian Medical Association, succeeding Dr. T. Clarence Routley of Toronto, who retires after 31 years in that office to become president-elect of the association. Dr. Routley is also president-elect of the British Medical Association. After internships at Hamilton General Hospital and the Hospital for Sick Children, Toronto, Dr. Kelly practiced as a pediatric specialist in Hamilton from 1928 to 1937 and served as secretary to the Ontario Medical Association from 1937 to 1940. For eight years he has been deputy secretary-general of the Canadian Medical Association. He served in the RCAF Medical Branch, 1940-1945, and held the appointment of deputy director of medical services with the rank of group captain.

(Left) Dr. Arthur Dill Kelly. (Right) Dr. T. Clarence Routley.

## LATIN AMERICA

**Meetings on Anesthesiology.**—The first Brazilian Congress and second Latin American Congress of Anesthesiology will be held Sept. 12 to 18 in São Paulo, Brazil. Official topics are "Artificial Hibernation" and "Anesthesia in Cardiovascular Surgery." The seminars include ganglioplegia, anesthesia in pediatrics, problems of respiration in a closed circuit, and anesthesia in minor surgery. Information may be obtained from Dr. Zairo E. G. Viveira, Secretary, Praça Floriano, 55-7.o and.-sala 13, Rio de Janeiro, Brazil.

**Mexican Scholarships.**—Scholarships for study in Mexico for the academic year beginning March 1, 1955, are being offered by the Mexican government to 11 graduate and 5 undergraduate students through the Mexico-United States Commission on Cultural Cooperation. Closing date for application is Nov. 1. Requirements for the awards are: U. S. citizenship, knowledge of Spanish, a good academic record, a valid project or purpose, and good health. The scholarships are expected to cover tuition and full maintenance but not incidental expenses and travel.

Recommended fields for graduate study or research are architecture, Indian and physical anthropology, ethnology, archeology, museography, painting, cardiology and tropical medicine, biological sciences, and Mexican history. Suggested undergraduate fields of study are philosophy, languages, and literature. Applicants with sufficient previous training may take Mexican history, ethnology, archeology, and physical anthropology. Information may be obtained from the Institute of International Education, 1 E. 67th St., New York.

## FOREIGN

**Congress on Chest Diseases.**—The International Congress on Diseases of the Chest will be held in Barcelona, Spain, Oct. 4 to 8, under the sponsorship of the Council on International Affairs of the American College of Chest Physicians and the patronage of the Spanish government. The sessions will begin with presentation of papers on carcinoma and other tumors; in all, more than 250 papers have been scheduled, of which 52 will be presented by physicians from the United States. The official languages of the congress are English, French, German, and Spanish. Dr. Andrew L. Banyai, Milwaukee, is chairman of the Council on International Affairs, and Mr. Murray Kornfeld is executive director, American College of Chest Physicians.

**World Congress on Welfare of Cripples.**—The sixth World Congress of the International Society for the Welfare of Cripples will assemble Sept. 13 to 17 at The Hague, Netherlands, under the joint auspices of the ISWC and the Netherlands Central Society for the Welfare of Cripples. The theme of the meeting will be "Changing Attitudes in a Changing World." The opening address, "A World Wide View: Improving Public Attitudes Toward the Crippled," will be delivered by Dr. Henry H. Kessler, Newark, N. J. In the afternoon there will be sectional meetings on public understanding and support of services for the crippled. On Wednesday Dr. Howard A. Rusk, New York, will give the principal address in a session on dynamic rehabilitation, and Dr. Meyer A. Perlstein, Chicago, will talk on cerebral palsy. Thursday morning will be devoted to a discussion on the organization of international services for the crippled. Friday morning there will be panel discussions on (1) early diagnosis and effective follow-up services; (2) voluntary services; and (3) governmental services. Excursions have been planned to orthopedic clinics, sheltered workshops, and rehabilitation centers and also to points of historic and cultural interest. The Central Council for the Care of Cripples, London, has arranged a postcongress tour to England, Sept. 20 to 26.

## CORRECTION

**Absence of Tonsils and Bulbar Poliomyelitis.**—In the paper by Anderson and Rondeau entitled "Absence of Tonsils as a Factor in the Development of Bulbar Poliomyelitis" on page 1123 of the July 24 issue of THE JOURNAL, an error was made in the headings for table 3 on page 1125. Throughout the table the columns labelled "With Tonsils" show figures for patients who had had a tonsillectomy and the columns labelled "Without Tonsils" show figures for patients who had not had this operation. This reversed the meaning of the figures and explains what was apparently a discrepancy between this table and tables 1 and 2.

# MEETINGS

**AMERICAN MEDICAL ASSOCIATION: Dr. George F. Lull, 535 North Dearborn St., Chicago 10, Secretary.**
**1954 Clinical Meeting, Miami, Florida, Nov. 29-Dec. 2.**
**1955 Annual Meeting, Atlantic City, N. J., June 6-10.**
**1955 Clinical Meeting, Boston, Nov. 29-Dec. 2.**
**1956 Annual Meeting, Chicago, June 11-15.**

AMERICAN MEDICAL ASSOCIATION PUBLIC RELATIONS INSTITUTE, Drake Hotel, Chicago, Sept. 1-2. Mr. Leo E. Brown, 535 N. Dearborn St., Chicago 10, Director.

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ACADEMY OF PSYCHOSOMATIC MEDICINE, New York, Oct. 8-9. Dr. Ethan Allan Brown, 75 Bay State Road, Boston 15, Secretary.

ALASKA TERRITORIAL MEDICAL ASSOCIATION, Mt. McKinley Park Hotel, Mt. McKinley Park, Aug. 15-17. Dr. William P. Blanton, P.O. Box 2569, Juneau, Secretary.

AMERICAN ACADEMY OF PEDIATRICS, Palmer House, Chicago, Oct. 4-7. Dr. E. H. Christopherson, 610 Church St., Evanston, Ill., Secretary.

AMERICAN ASSOCIATION OF BLOOD BANKS, The Shoreham, Washington, D. C., Sept. 13-16. Miss Marjorie Saunders, 3500 Gaston Ave., Dallas 4, Texas, Secretary.

AMERICAN ASSOCIATION OF MEDICAL RECORD LIBRARIANS, Sheraton-Cadillac Hotel, Detroit, Oct. 4-8. Miss Doris Gleason, 510 N. Dearborn St., Chicago 10, Executive Director.

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS AND ABDOMINAL SURGEONS, The Homestead, Hot Springs, Va., Sept. 9-11. Dr. Frank R. Lock, Bowman Gray School of Medicine, Winston-Salem, N. C., Secretary.

AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHABILITATION, Hotel Statler, Washington, D. C., Sept. 6-11. Dr. Walter J. Zeiter, 30 N. Michigan Ave., Chicago 2, Executive Director.

AMERICAN HOSPITAL ASSOCIATION, Palmer House, Chicago, Sept. 13-16. Dr. E. L. Crosby, 18 East Division St., Chicago 10, Director.

AMERICAN MEDICAL WRITERS' ASSOCIATION, Hotel Sherman, Chicago, Sept. 24. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.

AMERICAN OTORHINOLOGIC SOCIETY FOR PLASTIC SURGERY, The Waldorf-Astoria, New York, Sept. 19. Dr. Louis J. Feit, 66 Park Ave., New York, Secretary.

AMERICAN ROENTGEN RAY SOCIETY, Shoreham Hotel, Washington, D. C., Sept. 21-24. Dr. Barton R. Young, Germantown Hospital, Philadelphia 44, Secretary.

AMERICAN SOCIETY OF CLINICAL PATHOLOGISTS, Shoreham Hotel, Washington, D. C., Sept. 6. Dr. Clyde G. Culbertson, 1040-1232 W. Michigan St., Indianapolis, Secretary.

AMERICAN VETERINARY MEDICAL ASSOCIATION, Olympic Hotel, Seattle, Aug. 23-26. Dr. J. G. Hardenbergh, 600 South Michigan Blvd., Chicago 5, Executive Secretary.

CENTRAL ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS, Hotel Jefferson, St. Louis, Oct. 6-9. Dr. Harold L. Gainey, Suite 602, 116 S. Michigan Ave., Chicago 3, Secretary.

CLINICAL ORTHOPAEDIC SOCIETY, Sheraton Hotel, Chicago, Oct. 7-9. Dr. John H. Moe, 825 Nicollet Ave., Minneapolis, Secretary.

COLLEGE OF AMERICAN PATHOLOGISTS, The Shoreham, Washington, D. C., Sept. 12. Dr. Arthur H. Dearing, 203 N. Wabash Ave., Chicago 1, Executive Secretary.

COLORADO STATE MEDICAL SOCIETY, Broadmoor Hotel, Colorado Springs, Sept. 21-24. Mr. Harvey T. Sethman, 835 Republic Building, Denver 2, Executive Secretary.

INDUSTRIAL HEALTH CONFERENCE (Houston), Shamrock Hotel, Houston, Tex., Sept. 23-25. Dr. Sidney Schnur, 411 Medical Arts Bldg., Houston 2, Tex., Chairman.

KANSAS CITY SOUTHWEST CLINICAL SOCIETY, Kansas City, Mo., Oct. 4-7. Dr. Ira C. Layton, 306 E. Twelfth St., Kansas City 6e, Mo., Secretary.

KENTUCKY STATE MEDICAL ASSOCIATION, Brown Hotel, Louisville, Sept. 21-23. Dr. Bruce Underwood, 620 S. Third St., Louisville 2, Secretary.

MICHIGAN STATE MEDICAL SOCIETY, Sheraton-Cadillac Hotel, Detroit, Sept. 29-Oct. 1. Dr. L. Fernald Foster, 606 Townsend St., Lansing 15, Secretary.

MISSISSIPPI VALLEY MEDICAL SOCIETY, Hotel Sherman, Chicago, Sept. 22-24. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.

MONTANA MEDICAL ASSOCIATION, Hotel Finlen, Butte, Sept. 16-19. Mr. L. R. Hegland, 1236 N. 28th St., Billings, Executive Secretary.

NATIONAL PROCTOLOGIC ASSOCIATION, Congress Hotel, Chicago, Oct. 7-9. Dr. George E. Mueller, 59 E. Madison St., Chicago 2, Executive Secretary.

NEW HAMPSHIRE MEDICAL SOCIETY, Mt. Washington Hotel, Bretton Woods, Oct. 3-5. Dr. W. H. Butterfield, 18 School St., Concord, Secretary.

PACIFIC DERMATOLOGIC ASSOCIATION, Broadmoor Hotel, Colorado Springs, Colo., Sept. 2-4. Dr. Ben A. Newman, 436 N. Roxbury Drive, Beverly Hills, Calif., Secretary.

REGIONAL MEETINGS, AMERICAN COLLEGE OF PHYSICIANS:
Bismarck, N. D., Sept. 11. Dr. Robert B. Radl, 221 Fifth St., Bismarck, N. D., Governor.
Indianapolis, Claypool Hotel, Oct. 9. Dr. Wendell A. Shullenberger, 3740 Central Ave., Indianapolis, Chairman.

RENO SURGICAL SOCIETY, Reno, Nev., Aug. 19-21. Dr. James R. Herz, 508 Humboldt St., Reno, Nev., Secretary.

ROCKY MOUNTAIN RADIOLOGICAL SOCIETY, Shirley-Savoy Hotel, Denver, Aug. 19-21. Dr. John H. Freed, 227 Sixteenth St., Denver 2, Secretary.

SOUTHWESTERN SURGICAL CONGRESS, Skirvin Hotel, Oklahoma City, Sept. 20-22. Dr. C. R. Rountree, 1227 Classen Drive, Oklahoma City 3, Secretary.

THE CONSTANTINIAN SOCIETY, The Broadmoor, Colorado Springs, Colo., Sept. 26-29. Dr. C. F. Shook, P. O. Box 1035-36, Toledo 1, Ohio, Secretary.

U. S. CHAPTER, INTERNATIONAL COLLEGE OF SURGEONS, Chicago, Sept. 7-10. Dr. Karl Meyer, 1516 Lake Shore Dr., Chicago, Secretary.

VERMONT STATE MEDICAL SOCIETY, Mt. Washington Hotel, Bretton Woods, N. H., Oct. 3-5. Dr. James P. Hammond, 337 South St., Bennington, Secretary.

WASHINGTON STATE MEDICAL ASSOCIATION, Davenport Hotel, Spokane, Sept. 18-22. Dr. Bruce Zimmerman, 1309 Seventh Ave., Seattle 1, Secretary.

WESTERN ASSOCIATION OF RAILWAY SURGEONS, Sun Valley, Idaho, Sept. 23-25. Dr. Leo L. Stanley, 1322 Fifth Ave., San Rafael, Calif., Secretary.

WEST VIRGINIA STATE MEDICAL ASSOCIATION, The Greenbrier, White Sulphur Springs, Aug. 19-21. Mr. Charles Lively, P.O. Box 1031, Charleston, Executive Secretary.

WISCONSIN, STATE MEDICAL SOCIETY OF, Hotel Schroeder, Milwaukee, Oct. 5-7. Mr. Charles H. Crownhart, 704 E. Gorham St., Madison 3, Secretary.

## FOREIGN AND INTERNATIONAL

COMMONWEALTH HEALTH AND TUBERCULOSIS CONFERENCE, Royal Festival Hall, London, England, June 21-25, 1955. Mr. J. H. Harley Williams, Tavistock House North, Tavistock Square, London, W.C.1, England, Secretary General.

CONFERENCE OF INTERNATIONAL UNION AGAINST TUBERCULOSIS, Madrid, Spain, Sept. 26-Oct. 2, 1954. Secretariat, Escuela de Tisiologia, Ciudad Universitaria, Madrid, Spain.

CONGRESS OF INTERNATIONAL ASSOCIATION FOR THE PREVENTION OF BLINDNESS, New York, N. Y., U. S. A., Sept. 12-17, 1954. Professor Franceschetti, 2 Avenue Mirmot, Geneva, Switzerland, Secretary-General.

CONGRESS OF THE INTERNATIONAL DIABETES FEDERATION, Cambridge, England, July 4-8, 1955. Mr. James G. L. Jackson, 152 Harley St., London, W.1, England, Executive Secretary General.

CONGRESS OF INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY, Vichy, Paris, and Enghien, France, Sept. 24-27, 1954. For information write: Dr. Giulio Ammirandoli, Via Della Torretta 11, Montecatini Terme, Italy.

INTER-AMERICAN CONGRESS OF RADIOLOGY, Shoreham Hotel, Washington, D. C., U. S. A., April 24-29, 1955. Dr. Eugene P. Pendergrass, 3400 Spruce St., Philadelphia 4, Pa., U. S. A., Secretary-General.

INTER-AMERICAN SESSION, AMERICAN COLLEGE OF SURGEONS, Universidad Mayor de San Marcos de Lima, Lima, Peru, S. A., Jan. 11-14, 1955. Dr. Michael L. Mason, 40 East Erie St., Chicago 11, Ill., U. S. A., Secretary.

INTERNATIONAL ANESTHESIA RESEARCH SOCIETY, Ambassador Hotel, Los Angeles, Calif., U. S. A., Oct. 10-14, 1954. For information write: Dr. T. H. Seldon, 102-110 Second Avenue S.W., Rochester, Minn., U. S. A.

INTERNATIONAL CONGRESS OF CLINICAL PATHOLOGY, Washington, D. C., U. S. A., Sept. 6-10, 1954. Dr. Robert A. Moore, University of Pittsburgh, Schools of the Health Profession, Pittsburgh 13, Pa., U. S. A., Chairman, Committee on Arrangements.

INTERNATIONAL CONGRESS ON DISEASES OF THE CHEST, Barcelona, Spain, Oct. 4-8, 1954 Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Ill., U. S. A., Executive Secretary.

INTERNATIONAL CONGRESS OF HEMATOLOGY, Paris, Sept. 6-11, 1954. Dr. Jean Bernard, 86 rue d'Assas, Paris 6°, France, Secretary.

INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE, Rome and Salerno, Italy, Sept. 13-20, 1954. For information write: Segreteria XIV Congresso Internazionale di Storia della Medicina, Instituto di Storia della Medicine, Citta Universitaria, Rome, Italy.

INTERNATIONAL CONGRESS OF HYDATID DISEASE, Madrid, Spain, Sept. 25-30, 1954. Dr. Jesus Calvo Melendro, Hospital Provincial, Sorea, Spain, Secretary-General.

INTERNATIONAL CONGRESS OF INDUSTRIAL MEDICINE, Naples, Italy, Sept. 13-19, 1954. Professor Scipione Caccuri, Director, Institute of Industrial Medicine Policlinico, Naples, Italy, Chairman, Organizing Committee.

INTERNATIONAL CONGRESS OF INTERNAL MEDICINE, Stockholm, Sweden, Sept. 15-18, 1954. Professor Anders Kristenson, Karolinska Sjukhuset, Stockholm 60, Sweden, Secretary-General.

INTERNATIONAL CONGRESS ON MENTAL HEALTH, University of Toronto, Toronto, Ontario, Canada, Aug. 14-21, 1954. For information write: Executive Officer, International Congress on Mental Health, 111 St. George St., Toronto, Ontario, Canada.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY, Luxemburg, Luxemburg, Nov. 7-12, 1954. Colonel A. R. Vernengo, Direcion General de Sanidad Militar, Pozos 2045, Buenos Aires, Argentine, S. A., Secretary-General.

INTERNATIONAL CONGRESS OF NUTRITION, Amsterdam, Netherlands, Sept. 13-17, 1954. Dr. M. van Eekelen, Centraal Instituut voor Voedingsonderzoek T.N.O., 61 Catharynesingel, Utrecht, Netherlands, General Secretary.

INTERNATIONAL CONGRESS OF OPHTHALMOLOGY, University of Montreal and McGill University, Montreal, Canada, Sept. 9-11, 1954, and Waldorf-Astoria, New York, N. Y., U. S. A., Sept. 12-17, 1954. Dr. William L. Benedict, 100 First Avenue Building, Rochester, Minn., U. S. A., Secretary-General.

INTERNATIONAL CONGRESS OF ORTHOPEDIC SURGERY AND TRAUMATOLOGY, Berne, Switzerland, Aug. 30-Sept. 3, 1954. For information write: Professor M. Dubois, Isle-Hospital, Berne, Switzerland.

INTERNATIONAL FEDERATION OF MEDICAL STUDENT ASSOCIATIONS, Rome, Italy, Oct. 1-5, 1954. Mr. Jorgen Falck Larsen, 12, Kristianiagade, Copenhagen Ø, Denmark, General Secretary.

INTERNATIONAL HOSPITAL CONGRESS, Lucerne, Switzerland, May 30-June 3, 1955. Capt. J. E. Stone, International Hospital Federation, 10 Old Jewry, London, E.C.2, England, Hon. Secretary.

INTERNATIONAL POLIOMYELITIS CONGRESS, University of Rome, Orthopedic Clinic, Rome, Italy, Sept. 6-10, 1954. Mr. Stanley E. Henwood, 120 Broadway, New York 5, N. Y., U. S. A., Executive Secretary.

INTERNATIONAL SOCIETY OF BLOOD TRANSFUSION, Paris, France, Sept. 12-19, 1954. For information write: Colonel Julliard, Société Internationale de Transfusion Sanguine, 53 boulevard Diderot, Paris 12°, France.

INTERNATIONAL SOCIETY FOR CELL BIOLOGY, Leiden, Netherlands, Sept. 1-8, 1954. Professor Peter J. Gaillard, University of Leiden, Leiden, Netherlands, Secretary.

INTERNATIONAL SOCIETY OF GEOGRAPHICAL PATHOLOGY, Washington, D. C., U. S. A., Sept. 6-10, 1954. Professor Fred C. Roulet, Hebelstrasse 24, Basel, Switzerland, Secretary-General.

INTERNATIONAL SURGICAL CONGRESS, Geneva, Switzerland, May 23-26, 1955. Dr. Max Thorek, 1516 Lake Shore Drive, Chicago, Illinois, U. S. A., Secretary-General.

JAPAN MEDICAL CONGRESS, Kyoto University and Kyoto Prefectural Medical College, Kyoto, Japan, April 1-5, 1955. Dr. Mitsuharu Goto, University Hospital, Medical Faculty of Kyoto University, Kyoto, Japan, Secretary-General.

LATIN AMERICAN CONGRESS OF ANESTHESIOLOGY, Sao Paulo, Brazil, S. A., Sept. 12-18, 1954. Dr. Zairo E. G. Vieira, Praca Floriano, 55-7°, And., Rio De Janeiro, Brazil, S. A., Secretario.

LATIN AMERICAN CONGRESS OF PHYSICAL MEDICINE, Lima, Peru, S. A., Feb. 14-19, 1955. Dr. Cassius Lopez de Victoria, 176 East 71st St., New York 21, N. Y., U. S. A., Executive Director.

MEDICAL JOURNALISM MEETING, Exposition Universelle Romaine, Rome, Italy, Sept. 30, 1954. Dr. H. Clegg, B.M.A. House, Tavistock Square, London W.C.1, England, Secretary.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION CONGRESS, Lake Garda, Italy, Sept. 15-21, 1954. Dr. Ada Chree Reid, 118 Riverside Drive, New York 24, N. Y., U. S. A., President.

PAN AMERICAN HOMEOPATHIC MEDICAL CONGRESS, Hotel Gloria, Rio de Janeiro, Brazil, S. A., Oct. 2-13, 1954. Dr. Paul S. Schantz, 103 West Main St., Ephrata, Pa., U. S. A., Executive Secretary.

PAN-PACIFIC SURGICAL CONGRESS, Honolulu, Hawaii, Oct. 7-18, 1954. Dr. F. J. Pinkerton, Suite 7, Young Bldg., Honolulu 13, Hawaii, Director General.

WORLD CONGRESS OF CARDIOLOGY, Washington, D. C., U. S. A., Sept. 12-18, 1954. Dr. L. W. Gorham, 44 East 23d St., New York 10, N. Y., U. S. A., Secretary-General.

WORLD CONGRESS OF INTERNATIONAL SOCIETY FOR THE WELFARE OF CRIPPLES, Scheveningen-The Hague, Netherlands, Sept. 13-17, 1954. Secretariat: Miss H. P. Post, Pieter Lastmarkade 37, Amsterdam Z, Netherlands.

WORLD MEDICAL ASSOCIATION, Rome, Italy, Sept. 26-Oct. 2, 1954. Dr. Louis H. Bauer, 345 East 46th St., New York 17, N. Y., U. S. A., Secretary-General.

# EXAMINATIONS AND LICENSURE

## EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written.* Various centers, Sept. 2. *Oral.* Ann Arbor, Oct. 15-18. To be eligible candidates must have completed thirty-six months of training by October 1. Final date for filing application was May 1. Exec. Sec., Miss Janet Newkirk, 129 E. 52nd St., New York 22.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* New York, Sept. 22-24 (candidates on the east coast). The closing date for acceptance of applications was April 1. *Written.* Oct. 18. Final date for acceptance of applications was May 1. *Subspecialties. Allergy.* New York, Sept. 23 and *Pulmonary Disease.* New York, Sept. 24. Closing date for acceptance of applications was May 10. Exec. Sec.-Treas., Dr. William A. Werrell, One West Main St., Madison 3, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* New Haven, November. Final date for filing application is November 1. Sec., Dr. Leonard T. Furlow, 600 S. Kingshighway, St. Louis 10.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Part I.* Various Centers, Feb. 4. *Part II,* Chicago. Deadline for receipt of applications is October 1. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6.

AMERICAN BOARD OF OPHTHALMOLOGY: *Practical examinations, 1954.* New York City, Dec. 5-9. Final date for filing applications was July 1, 1953. *Written, 1955.* Various cities, Jan. 24-25. Final date for filing application was July 1, 1954. *Practical examinations, 1955.* Philadelphia, June 10-15, Chicago, Oct. 9-14. Sec., Dr. Edwin B. Dunphy, 56 Ivie Road, Cape Cottage, Maine.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Oral and Written.* Los Angeles, Jan. 26-28. Final date for filing applications for Part II is Aug. 15. Sec., Dr. Harold A. Sofield, 122 South Michigan Ave., Chicago 3, Ill.

AMERICAN BOARD OF OTOLARYNGOLOGY. New York City, Sept 13-17; Richmond, Va., March 6-10, 1955. Sec., Dr. Dean M. Lierle, University Hospital, Iowa City.

AMERICAN BOARD OF PATHOLOGY. Miami, Nov. 29-30-Dec. 1. Sec., Dr. William B. Wartman, 303 E. Chicago Ave., Chicago 11.

AMERICAN BOARD OF PEDIATRICS: *Oral.* Chicago, Oct. 8-10 and New Haven, Dec. 3-5. Ex. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION. *Oral and Written.* Washington, D. C., Sept. 5-6. Final date for filing applications was March 31. Sec., Dr. Earl C. Elkins, 30 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PLASTIC SURGERY. Atlanta, Ga., Oct. 20-22. Final date for filing case reports was June 1. Final date for filing case reports for spring 1955 examination is Jan. 1. Corres. Sec., Miss Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8.

AMERICAN BOARD OF PREVENTIVE MEDICINE: *Parts 1 and 2.* Buffalo, Oct. 9-11. Final date for filing applications was July 15. Sec., Dr. Ernest L. Stebbins, 615 N. Wolfe St., Baltimore.

AMERICAN BOARD OF PROCTOLOGY. *Part II.* Philadelphia, Sept. 25-26. *Examination in Proctology and Anorectal Surgery.* Sec., Dr. Stuart T. Ross, 131 Fulton Ave., Hempstead, New York

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 13-14; New Orleans, Feb. 28-March 1, 1955; San Francisco, Mid-October, 1955; New York City, December, 1955. Sec., Dr David A. Boyd, 102-110 Second Ave. S.W., Rochester, Minnesota.

AMERICAN BOARD OF RADIOLOGY: *Oral.* Washington, D. C., September. Final date for filing application for the September examination was May 1. Sec., Dr. B. R. Kirklin, 102-110 Second Ave. S.W., Rochester, Minn.

# DEATHS

**Collier, George Kirby** ⊕ Rochester, N. Y.; born in Wilmington, N. C., March 23, 1879; College of Physicians and Surgeons, Baltimore, 1900; an Associate Fellow of the American Medical Association; specialist certified by the American Board of Psychiatry and Neurology; past president of the Medical Society of the County of Monroe, the National Association for the Study of Epilepsy, and the Mental Hygiene Society of the County of Monroe; member of the American Psychosomatic Society, American Psychiatric Association, Association for Research in Nervous and Mental Diseases, and the American Psychopathological Association; fellow of the American College of Surgeons; honorary chairman of the Committee for Education on Alcoholism, a founder and past president of the Rochester Rehabilitation Center, and a member of the Research Council on the Problems of Alcohol; in 1951 the Rochester Academy of Medicine presented to him the Albert David Kaiser medal, the highest award of the academy, "in recognition of his services to humanity"; the Episcopal Diocese of Rochester gave him the Bishop's Keys for distinguished service in the cause of humanity; clinical assistant, assistant physician, and assistant medical superintendent at the Craig Colony in Sonyea from 1902 to 1919, when he became consultant in psychiatry; consultant in psychiatry at the University of Rochester; staff consultant at the Strong Memorial, Highland, St. Mary's, Park Avenue, Monroe County, and Rochester State hospitals; served as psychiatrist to the Rochester Board of Education; died June 18, aged 75, of emphysema.

**Nathanson, Ira Theodore** ⊕ Boston; born in Virginia, Minn., July 20, 1904; Northwestern University Medical School, Chicago, 1930; associate clinical professor of surgery at Harvard Medical School; member of the New England Surgical Society, American Society for Clinical Investigation, Endocrine Society, American Academy of Arts and Sciences, American Association for Cancer Research, American Cancer Society, American Physiological Society, American Association for the Advancement of Science, New England Cancer Society, and the Boston Surgical Society; chairman of the committee on cancer diagnosis and therapy, National Research Council, and of the subcommittee on cancer and steroids of the American Medical Association; fellow of the American College of Surgeons; on the staffs of the Pondville Hospital in Walpole and the Massachusetts General Hospital; died May 3, aged 49.

**Martin, Robert Valory,** Rockville Centre, N. Y.; born in Brooklyn May 8, 1913; New York Medical College, Flower and Fifth Avenue Hospitals, New York, 1939; certified by the National Board of Medical Examiners; served during World War II; assistant instructor in orthopedic surgery at his alma mater; founder and medical director of the Nassau County Cerebral Palsy Center at Roosevelt, N. Y.; medical director of Suffern-Rockland County Cerebral Palsy Center and Hudson County Cerebral Palsy League; consultant in cerebral palsy for Sullivan, Dutchess, and Ulster counties; served as chief of orthopedic service at the Metropolitan Hospital in New York City, and on the staffs of the Victory Memorial and Norwegian Lutheran Deaconesses' Home and Hospital in Brooklyn; died in Nassau Hospital in Mineola, May 18, aged 40, of adenocarcinoma of the rectum.

**Minsky, Henry** ⊕ New York City; born in New York City June 21, 1895; Columbia University College of Physicians and Surgeons, New York, 1919; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology and the Association for Research in Ophthalmology; fellow of the American College of Surgeons; past president of the Metropolitan Medical Society; associate clinical professor of ophthalmology at his alma mater; on the staff of the Mount Sinai Hospital; consultant, Maimonides Hospital, Liberty, Hillside Hospital, Bellerose, N. Y., and Norwalk (Conn.) General Hospital; died in the Northern Dutchess Health Center, Rhinebeck, N. Y., May 23, aged 58, of cerebral hemorrhage.

**Lyman, Harry Webster** ⊕ St. Louis; born March 10, 1873; St. Louis College of Physicians and Surgeons, 1895; emeritus professor of clinical otolaryngology at Washington University School of Medicine, where he joined the faculty in 1910 and served continuously; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology, American Laryngological Association, American Laryngological, Rhinological and Otological Society, and the American Otological Society; fellow of the American College of Surgeons; served during World War I; affiliated with Barnes, Evangelical Deaconess, Jewish, St. Louis Children's, and St. Louis Maternity hospitals, and the Shriners' Hospital for Crippled Children; died May 6, aged 81.

**Sharp, Cecil Augustus Zachary** ⊕ Clayton, Mo.; born in Carlyle, Ill., Oct. 30, 1908; Université de Genéve Faculté de Médecine, Switzerland, 1933; specialist certified by the American Board of Preventive Medicine; formerly assistant professor of public health and preventive medicine at Washington University School of Medicine in St. Louis; fellow of the American Public Health Association; at one time health officer of Will County, Ill., and health commissioner of St. Louis County; served as state district health officer with headquarters at Highland, Ill.; since 1949 area medical administrator for the United Mine Workers Association Welfare and Retirement Fund; in 1938 received a degree of master of science in public health at the University of Michigan; was shot and killed June 29, aged 45.

**Fischmann, Egon Walter** ⊕ Chicago; born in Prague, Bohemia, March 21, 1885; Rush Medical College, Chicago, 1906; specialist certified by the American Board of Obstetrics and Gynecology, Inc.; member of the Central Association of Obstetricians and Gynecologists and the International College of Surgeons; fellow of the American College of Surgeons; after 21 years as professor and chairman of the department of obstetrics and gynecology of the Chicago Medical School, retired from active teaching and administration of the department in 1952; for many years on the faculty of the University of Illinois College of Medicine, and professor of gynecology at the Cook County Graduate School; served on the staffs of Cook County Hospital and Grant Hospital, where he died June 13, aged 69, of pyelonephritis and benign hypertrophy of the prostate.

**McLaughlin, Edward Francis** ⊕ Philadelphia; born in Philadelphia June 27, 1903; University of Pennsylvania School of Medicine, Philadelphia, 1928; specialist certified by the American Board of Surgery; member of the board of directors of the Philadelphia County Medical Society from 1951 to 1953; fellow of the American College of Surgeons; clinical assistant professor of surgery at Woman's Medical College of Pennsylvania and assistant professor of surgery at the University of Pennsylvania Graduate School of Medicine; served during World War II; chairman of the department of surgery, Nazareth Hospital; chief of surgery at Chestnut Hill Hospital; chief of service, department of surgery, Germantown Dispensary and Hospital, where he died May 31, aged 50, of myelogenous leukemia.

**Levinson, Sidney Older** ⊕ Chicago; born in New York City, Oct. 13, 1904; Washington University School of Medicine, St. Louis, 1927; clinical assistant professor of pediatrics at the University of Illinois College of Medicine; associated since 1927 with the Michael Reese Hospital, where he was on the staff since 1931, executive director of the research foundation since 1941, chief of the Samuel Deutsch Serum Center, and chief of the department of serum and blood therapy; served as senior consultant, division of medicine and surgery, Veterans Administration Hospital, Hines, Ill.; consultant in poliomyelitis,

⊕ Indicates Member of the American Medical Association.

Chicago Health Department, and Illinois Department of Public Health from 1931 to 1943; posthumously awarded the honorary degree of doctor of science by the Chicago Medical School in June, 1954; died June 20, aged 49, of carcinoma of the pancreas.

**Alspach, Earl Zartman,** Akron, Ohio; Starling Medical College, Columbus, 1903; served on the Mexican border, and as a first lieutenant in the medical corps of the 37th division of the American Expeditionary Force during World War I; formerly on the staff of the Citizens Hospital in Barberton; died in the City Hospital May 22, aged 73, of arteriosclerotic heart disease.

**Armstrong, James** ⊕ Columbia, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1909; affiliated with the Columbia Hospital; died May 21, aged 70, of heart disease.

**Ashley, Thad Warner** ⊕ Kenosha, Wis.; Miami Medical College, Cincinnati, 1901; life member of the American Academy of Ophthalmology and Otolaryngology; past president of the Kenosha County Medical Society; physician and surgeon in the relief department, Baltimore and Ohio Railroad, Newark, Ohio; died May 18, aged 80.

**Baer, Arthur** ⊕ Cleveland; Kaiser-Wilhelms-Universität Medizinische Fakultät, Strassburg, Germany, 1905; died in Mount Sinai Hospital April 17, aged 74, of cerebral hemorrhage.

**Bailey, Samuel Sumner** ⊕ Columbus, Ohio; Starling-Ohio Medical College, 1909; died April 18, aged 77, of cardiac insufficiency.

**Baldwin, Hugh Allen** ⊕ Columbus, Ohio; Jefferson Medical College of Philadelphia, 1901; specialist certified by the American Board of Urology; member of the American Urological Association and the Radiological Society of North America; fellow of the American College of Surgeons; chief of staff and president of the board of trustees at the Grant Hospital, where he died June 14, aged 75, of nephritis and uremia.

**Barbour, Harry Arnold** ⊕ Mayville, Mich.; Detroit Homeopathic College, 1904; died in Lapeer May 13, aged 74, of coronary occlusion and arteriosclerosis.

**Biemesderfer, Frank I.,** Lancaster, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1891; served on the staff of St. Joseph's Hospital; died in the Lancaster General Hospital May 21, aged 86, as the result of a fall.

**Boudreau, Clarence Edwin** ⊕ El Dorado, Kan.; Fort Worth School of Medicine, Medical Department of Texas Christian University, 1912; Columbia University College of Physicians and Surgeons, New York, 1913; fellow of the American College of Surgeons; served during World War I; affiliated with the Susan B. Allen Memorial Hospital, where he died June 14, aged 76, of shock, following an automobile accident.

**Brown, Paul Ernest** ⊕ Scranton, Pa.; Johns Hopkins University School of Medicine, Baltimore, 1920; on the staff of the Hahnemann Hospital; died June 9, aged 60, of coronary thrombosis.

**Burke, Francis Ramon** ⊕ Quincy, Mass.; Harvard Medical School, Boston, 1903; fellow of the American College of Surgeons; member of the Industrial Medical Association; served during World War I; for many years on the staff of the Quincy City Hospital, where he died June 22, aged 77, of carcinoma of the lung.

**Carr, Catherine Creighton** ⊕ Asheville, N. J.; Johns Hopkins University School of Medicine, Baltimore, 1919; served as school physician for the health department; died in Biltmore Forest April 17, aged 61, of carcinoma of the stomach and pancreas.

**Charles, Harvey Phillip,** Kansas City, Mo.; Kansas Medical College, Medical Department of Washburn College, Topeka, 1913; died in the Veterans Administration Hospital April 9, aged 64.

**Cochran, Frederick Albert,** Brucetown, Va.; Jefferson Medical College of Philadelphia, 1896; died April 4, aged 80, of cerebral vascular thrombosis.

**Cornell, Corwin S.** ⊕ Knoxville, Iowa; Rush Medical College, Chicago, 1913; past president and for many years secretary-treasurer of the Marion County Medical Society; formerly county coroner and city health officer; served overseas during World War I; formerly affiliated with the Veterans Administration Hospital; died June 10, aged 67, of cardiovascular renal disease.

**Cox, Edward Rochford** ⊕ Coalinga, Calif.; College of Physicians and Surgeons, Los Angeles, 1917; school physician; died in the Coalinga District Hospital June 8, aged 60.

**Daugherty, Harold Austin** ⊕ Stoneboro, Pa.; Western Reserve University School of Medicine, Cleveland, 1927; died in Asheville, N. C., April 28, aged 52, of hypertrophic cirrhosis of the liver.

**Dimont, Joseph,** St. Louis; Western Reserve University School of Medicine, Cleveland, 1941; died June 15, aged 38.

**Dowsett, Charles Horace,** Watseka, Ill.; Northwestern University Medical School, Chicago, 1908; past president and secretary-treasurer of the Iroquois County Medical Society; for several terms a member of the elementary school board of education; served during World War I; for 38 years staff member of the Iroquois Hospital, where he died May 30, aged 72, of arteriosclerotic heart disease.

**Edlund, Gustaf** ⊕ St. Paul; Northwestern University Medical School, Chicago, 1921; on the staff of the Gillette State Hospital for Crippled Children, St. Luke's, and Midway hospitals; died June 10, aged 61, of coronary sclerosis.

**Evers, John Robert** ⊕ Wentworth, N. H.; Fordham University School of Medicine, New York, 1910; member of the Medical Society of the State of New York; fellow of the American College of Surgeons; formerly consulting surgeon at the Tarrytown (N. Y.) Hospital; died in Plymouth, April 11, aged 65, of aneurysm of the aorta and arteriosclerosis.

**Felsen, Herman** ⊕ Easthampton, Mass.; L.R.C.P., of Edinburgh, L.R.C.S., of Edinburgh, and L.R.F.P.S., of Glasgow, Scotland, 1937; served during World War II; medical examiner for the local selective service board; at one time school physician; formerly affiliated with the Hampshire County Sanatorium in Haydenville; on the staff of the Cooley Dickinson Hospital in Northampton, where he died May 25, aged 42, of coronary thrombosis and myocardial infarction.

**Finkelstein, Israel** ⊕ Brooklyn; Long Island College Hospital, Brooklyn, 1927; died in the Maimonides Hospital June 29, aged 51.

**Fourt, Arthur Shannon** ⊕ Melbourne, Iowa; State University of Iowa College of Medicine, Iowa City, 1924; veteran of World Wars I and II; formerly employed in various capacities at his alma mater; affiliated with hospitals in Marshalltown; died in the University Hospital, Iowa City, June 6, aged 58, of aortic aneurysm.

**Fowler, Harry Lester** ⊕ Los Angeles; Rush Medical College, Chicago, 1922; died March 12, aged 61.

**Froehlich, Kurt Paul** ⊕ Moline, Ill.; Medizinische Fakultät der Universität, Vienna, Austria, 1933; certified by the National Board of Medical Examiners; died in the Lutheran Hospital March 25, aged 45.

**Graff, John Miller** ⊕ Detroit; University of Michigan Medical School, Ann Arbor, 1920; on the staff of St. Joseph's Mercy Hospital; died May 4, aged 60, of coronary occlusion and hypertensive heart disease.

**Gray, Walter O.,** Worland, Wyo.; University Medical College of Kansas City, Mo., 1907; for many years mayor of Worland; chairman of the board of directors of the Farmers State Bank, of which he was president; affiliated with the Washakie Memorial Hospital, where he died June 1, aged 75.

**Hansen, Victor Martin Jr.** ⊕ Lancaster, Calif.; College of Medical Evangelists, Loma Linda and Los Angeles, 1949; served during World War II; formerly on the staff of Tehachapi (Calif.) Valley Hospital; died May 2, aged 29, of cancer of the colon and ulcerative colitis.

**Harris, Earl** ⊕ Fort Worth, Texas; Tulane University of Louisiana School of Medicine, New Orleans, 1921; also a graduate in pharmacy; died recently, aged 66, of cancer.

**Krohn, Albert Henry** ⊕ Detroit; Detroit College of Medicine and Surgery, 1917; served during World War I; died June 2, aged 61.

**Leatherock, Robert Edwin,** Cushing, Okla.; Illinois Medical College, Chicago, 1898; on the staff of the Masonic Hospital; died June 2, aged 81, of carcinoma of the prostate.

**Lightfoot, Philip Malcolm** ✠ Shorter, Ala.; Medical College of Alabama, Mobile, 1900; president of the Macon County Board of Education, of which he was a charter member; on the staff of the Macon County Hospital in Tuskegee; died May 27, aged 77, of bronchogenic carcinoma.

**Linenthal, Harry** ✠ Brookline, Mass.; Harvard Medical School, Boston, 1904; specialist certified by the American Board of Internal Medicine; formerly on the faculty of Tufts College Medical School, Boston; physician in chief at the Beth Israel Hospital, Boston, from 1928 to 1946, when he became chief emeritus; for many years on the staff of Massachusetts General Hospital and consultant at the Massachusetts Charitable Eye and Ear Infirmary in Boston; died in Boston June 10, aged 78, of rupture of arteriosclerotic aneurysm of abdominal aorta.

**Lofgren, Emil** ✠ Rockford, Ill.; Northwestern University Medical School, Chicago, 1901; an Associate Fellow of the American Medical Association; died in the Swedish-American Hospital March 9, aged 80.

**Lynch, Charles S.,** Ardmore, Okla.; College of Physicians and Surgeons, Medical Department of Kansas City University, 1902; died April 15, aged 79, of cancer.

**McCann, James Perry,** Ozark, Mo.; American Medical College, St. Louis, 1902; died in St. John's Hospital, Springfield, June 6, aged 73.

**McNamara, John Ignatius,** Taunton, Mass.; Tufts College Medical School, Boston, 1918; served during World War I; for many years member of the city board of health; on the staff of the Morton Hospital; died May 17, aged 60, of coronary thrombosis.

**Mangel, Benjamin** ✠ Brooklyn; University of St. Andrews Conjoint Medical School, St. Andrews and Dundee, Scotland, 1935; on the staffs of the Unity and Adelphi hospitals, and the Kew Gardens (N. Y.) General Hospital; died in the Mount Sinai Hospital June 22, aged 45, of subarachnoid hemorrhage.

**Martin, Floyd August,** Columbia, Mo.; Johns Hopkins University School of Medicine, Baltimore, 1914; professor of microbiology and chairman of the department at the University of Missouri School of Medicine; died in El Dorado Springs June 2, aged 65.

**Mattes, Richard J.,** Vandalia, Ill.; Physio-Medical College of Indiana, Indianapolis, 1896; died in the Mark Greer Hospital May 27, aged 87.

**Megee, W. K.** ✠ Moberly, Mo.; St. Louis Medical College, 1884; died May 24, aged 92, of chronic nephritis and uremia.

**Miller, Harold Clayton** ✠ Eglon, W. Va.; University of Cincinnati College of Medicine, 1921; also an ordained minister; on the courtesy staff of Grafton (W. Va.) City Hospital and the Myers Clinic Hospital in Philippi, where he died May 18, aged 62, of carcinoma of the right kidney with metastases to the brain, lungs, and bones.

**Moore, James Henry** ✠ Whitmire, S. C.; Atlanta Medical College, 1897; member of the American College of Chest Physicians and the American Trudeau Society; for many years on the staff of the Loomis (N. Y.) Sanatorium; at one time on the staff of Batson Memorial Sanatorium in Lafayette, Ala.; died in Milledgeville, Ga., March 29, aged 86, of hypostatic pneumonia.

**Nash, Cleve Crumby** ✠ Dallas, Texas; Washington University School of Medicine, St. Louis, 1907; specialist certified by the American Board of Psychiatry and Neurology, Inc.; clinical assistant professor of surgery at Southwestern Medical School of the University of Texas; on the staffs of the Methodist, Parkland, and St. Paul's hospitals; died June 14, aged 69.

**Putman, Willard Nichols** ✠ Battle Creek, Mich.; the Hahnemann Medical College and Hospital, Chicago, 1906; served during World War I; for many years county coroner; on the staff of the Community Hospital and the Leila Y. Post Montgomery Hospital; died in the Battle Creek Sanitarium May 28, aged 73, of coronary thrombosis.

**Redyk, Mitchell Daniel,** Chicago; Loyola University School of Medicine, Chicago, 1946; served during World War II; died July 1, aged 36, of coronary occlusion, chronic myocarditis, and cirrhosis of the liver.

**Reed, John Franklin,** Edinburg, Ill.; Eclectic Medical Institute, Cincinnati, 1899; died in the Memorial Hospital, Springfield, May 30, aged 89, of arteriosclerotic heart failure.

**Richardson, Noah Tendle,** Montverde, Fla.; Atlanta Medical College, 1891; died April 10, aged 84, of cardiac failure.

**Robb, Eugene Erl,** Detroit; Detroit College of Medicine, 1904; died May 16, aged 76, of carcinoma of the cecum.

**Robinson, John Edwin,** Springfield, Mo.; Rush Medical College, Chicago, 1915; retired Jan. 1, 1950, as senior surgeon, U. S. Public Health Service Reserve; served during World War I; died in St. John's Hospital April 24, aged 68.

**Roost, Frederick H.** ✠ Sioux City, Iowa; Rush Medical College, Chicago, 1902; served overseas during World War I; affiliated with St. Joseph Mercy and St. Vincent's hospitals; a longtime member and past president of the Sioux City library board; died June 9, aged 77.

**Sadler, Finis Ewing,** Abilene, Texas; Memphis (Tenn.) Hospital Medical College, 1904; died June 2, aged 75, of cancer.

**Sargent, Jesse S.,** Springfield, Mo.; Homeopathic Medical College of Missouri, St. Louis, 1894; died in the Burge Hospital April 19, aged 85.

**Smith, Myrtle Lee** ✠ Livingston, Tenn.; Woman's Medical College of Pennsylvania, Philadelphia, 1926; member of the American Academy of General Practice; formerly a medical missionary in the Belgian Congo; director of the tri-county health unit; served as health officer of Choctaw County, Ala.; died near Carthage June 1, aged 53, of injuries received in an automobile accident.

**Thomas, Charles Francis,** Caribou, Maine; Harvard Medical School, Boston, 1912; state district health officer; died in Presque Isle March 13, aged 68, of diabetes mellitus and gangrene of the right foot.

**Towle, George Nash,** Winthrop, Maine; Boston University School of Medicine, 1890; died in Presque Isle March 23, aged 87, of cerebral arteriosclerosis.

**Urquhart, Clarence Clybourne,** Ironwood, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1905; formerly city health officer; died in Milwaukee June 29, aged 71, of myocardial infarction due to atherosclerosis and diabetes mellitus.

**Van Loon, Harry Franklin** ✠ Albany, N. Y.; Albany Medical College, 1910; member of the Industrial Medical Association; for many years on the staff of the Memorial Hospital; died May 20, aged 71, of coronary thrombosis.

**West, John Robert III** ✠ New York City; Columbia University College of Physicians and Surgeons, New York, 1943; certified by the National Board of Medical Examiners; specialist certified by the American Board of Urology; assistant professor of medicine at his alma mater; served during World War II; on the staffs of the Presbyterian and Bellevue hospitals; died in the Harkness Pavilion, Presbyterian Hospital, June 29, aged 36, of acute leukemia.

**Whitfield, Walter Eugene,** Edna, Texas; Southern Methodist University Medical Department, Dallas, 1911; formerly city health officer of Ganado, and during World War II county doctor for Selective Service; on the school board of Edna; died in Victoria recently, aged 66, of coronary occlusion.

**Wolff, Rudolf** ✠ Mill Valley, Calif.; Universität Heidelberg Medizinische Fakultät, Baden, Germany, 1912; on the staff of the San Rafael (Calif.) General Hospital, where he died May 20, aged 65, of cerebral vascular hemorrhage and hypertensive cardiovascular disease.

**Zorger, Annie L.** ✠ Waynesville, Ill.; American Medical College, St. Louis, 1894; died May 28, aged 89, of chronic myocarditis and arteriosclerosis.

# FOREIGN LETTERS

## COLOMBIA

**New Obstetric Maneuver for Dystocia.**—At the first meeting of the Society of Obstetrics and Gynecology of Colombia recently held in Bogotá, Dr. R. Ramírez Merchán described a maneuver by which satisfactory results have been obtained in many cases of dystocia for several years. This consists of the application of forceps in transverse and vertex posterior presentations that constitute serious obstetric problems. This maneuver was first described in 1950. Since then its value has been confirmed by many obstetricians. According to Dr. Merchán, the advantages of the technique are as follows. 1. The maneuver changes all posterior and transverse into anterior presentations. 2. Rotation is carried out with only one blade, whereas the guiding hand protects the canal and prevents the vaginal tearing that is a frequent complication when rotation is made with the articulated forceps. 3. The forceps are applied only once, whereas in classic maneuvers and in the maneuvers of Scanzoni, Bill-Scanzoni, King-Scanzoni, Tucker MacLean, etc. repeated application is necessary. 4. Manipulation is minimal, because only a hand is used in placing both blades for delivery. 5. The maneuver may be used for either transverse or posterior sacral presentations. 6. Right and left presentations are controlled by the same principles, except for the direction of rotation. Consequently, the blade is carried with the right hand in right presentations and with the left hand in left presentations.

**Visitors to Colombia.**—Many foreign visitors came to Colombia at the special invitation of the Colombian medical profession and gave lectures or courses during their stay in the country. Dr. Georges Portman of Bordeaux, France, considered the problem connected with cancer and otorhinolaryngology; Dr. J. J. Conlay, New York, dealt with esophagoplasty for cervical cancer; Dr. J. Ramírez Dueñas, Guayaquil, Ecuador, discussed radical surgery of advanced pelvic cancer; Dr. A. Winkelstein, New York, gave a course in gastroenterology in the Consultorio de Especialistas de Bogotá; Dr. P. H. Hoch, New York, gave a course in psychiatry at the Instituto Colombiano del Sistema Nervioso; Dr. G. Bergman, Cordoba, Argentina, gave a course in psychiatry in Bogotá; Dr. H. Gastaut, Marseilles, France, gave a course in the electroclinical study of epilepsy in the Unidia Center of Bogotá; Dr. C. P. Lamar, Miami, Fla., gave lectures on endocrinology; Dr. M. Fishbein, Chicago, gave lectures on general aspects of medical practice; and Dr. P. C. Simonart, Philadelphia, gave a course on psychosomatic medicine in the Instituto Colombiano del Sistema Nervioso.

## ECUADOR

**Death Rate in Infants.**—Dr. A. Valenzuela found that the death rate in infants, although still very high, has greatly diminished in the last 10 years as a result of the greater attention given by the various governmental organizations to pregnant women and infants. More than 50% of the deaths in early childhood occur before the age of 4 years. The mortality rate for infants under 1 year of age in the various regions of the country is now between 21 and 39%. The lowering of death rate in infants in the first year of life has been observed throughout the country but is greatest in urban centers. The main causes of infant mortality are gastroenteritis and bronchopulmonary diseases (*Rev. ecuator. Pediat.* **4**:131 [Dec.] 1954).

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The items in these letters are contributed by regular correspondents in the various foreign countries.

## ENGLAND

**Accident Prevention.**—In the introductory article in a symposium on accident prevention in *The Practitioner* (**172**:613, 1954), Sir John Charles points out that in England and Wales, between 1900 and 1950, accidents climbed from the 13th to the 5th place in the ranking of major causes of death. He stresses the importance of age as a predisposing factor. Thus, children under the age of 5 suffer 10% of all fatal accidents, and men and women over the age of 65 are concerned in 40%. This means that these two age groups, comprising less than 20% of the population, are the victims of 50% of the fatal accidents. In the case of fatal accidents in the home, about 80% of these occur in the same two age groups. In children between the ages of 1 and 4 years, accidents are the second commonest cause of death; in those between 5 and 9 years, they constitute the leading cause of mortality. "It is one of the most significant facts in the whole of our study that when the deaths from motor and other vehicles are removed from the grand total of fatal accidents, accidents in the home or place of residence cause 60% of the residual mortality, as compared with 40% which is associated with the place of work."

Interesting confirmation of many of these general statements is provided in the same symposium by Seiler and Ramsay (*Practitioner* **172**:628, 1954), who analyzed the records of 1,544 patients in Edinburgh, representing 3.31 per 1,000 of the population of the city, who required hospital treatment in 1950 for home accidents. About 5,500, or one in 85 of the population, were treated during the year either at hospitals or by general practitioners. For the sake of completeness they have included 38 patients who died at home of accidental suffocation and gas poisoning; this gives a total of 1,582. One of every 62 Edinburgh children under 5, and one of every 36 2-year-old children, required hospital treatment during 1950 for accidents in the home, compared with one of 71 in the group over 85 years of age. Almost two-thirds of the accidents were among females, the rates for the two sexes being about equal in those under 15 and those over 85. Falls caused 42% of all accidents and were responsible for 58% of all deaths from home accidents. Scalding and burning accidents accounted for 30% of all accidents—301 scalds and 164 burns. In young children, 15 scalds occurred when the child was sitting on an adult's knees at the table, and a further 29 resulted from pulling over cups or plates with hot foods or fluids that had been placed on the table before the family had been seated.

In this connection, in another article in the same symposium, dealing with burns and scalds in the home, J. S. Tough recommends that when there are young children in the house tablecloths should be replaced by individual table mats, and he urges the adoption of a more stable cup and saucer design than at present available. "Cups which narrow markedly towards the base and saucers with high lips are most dangerous, but the majority of designs in common use are at best an unstable combination easily tipped over by a child's fingers reaching up to the table." Of the 21 scalds caused by immersion in hot water, 20 occurred among children under 5 years of age and "were the result of carelessness of adults, either by using too hot water when bathing or by leaving kitchen utensils containing hot water within reach of young children." One baby suffered a severe buttock scald when placed on a pot of boiling water—an old-fashioned method of treating constipation. Of the 164 burns, 93 occurred in children under 5.

There were 49 (3.1%) accidents that required hospital attention for poisoning or asphyxiation—22 from drugs, 19 from coal gas, and 8 from cleansing materials. All cases of poisoning by drugs involved children, all but two being under 5 years of age. The drugs included aspirin or "junior" aspirin (8 cases), iron compounds (5 cases), thyroid tablets (2), digoxin (2), strychnine (2), ephedrine, dextroamphetamine (Dexedrine) sulfate, and sulfonamides.

In another article on accidental poisoning (*Practitioner* 172:649, 1954), Fraser draws attention to the increased number of fatal poisonings among children in the country as a whole—21 in 1943 and 56 in 1952. Of the 231 British children who died from poisoning in the five year period 1948 to 1953, the largest number of deaths were those due to ferrous sulfate (33), antihistamines (26), strychnine (24), aspirin (21), and methyl salicylate (12).

To revert to the Edinburgh inquiry, home accidents were responsible for 105 deaths during the year—a case mortality of 6.64%. There were 21 deaths among children under 5 and 72 among persons over 65. It is estimated that the 1,582 patients included in the survey required 6,251 days in the hospital and 5,608 visits to outpatient departments. This means that the equivalent of 17 hospital beds was continually occupied by home accidents at a cost to the community of over £10,000 a year. Home accidents were found oftener in unsatisfactory and overcrowded houses. More than half the accidents occurred in the morning or late afternoon, but one out of every six accidents among children under 5 years of age occurred after 7 p. m. It is considered that one-third of the accidents could have been avoided if greater care or supervision had been given to young children.

**Checking the Practitioner's Prescribing.**—In 1950, after consultation with the British Medical Association, the Ministry of Health set up a "prescribing investigation unit" to examine the prescriptions of physicians whose prescribing is above the average as regards cost. The unit has now reviewed the prescribing of 4,400 general practitioners in England and Wales or nearly a quarter of all the general practitioners in the country. This resulted in 883 being cited on the grounds that their prescribing costs appeared unusually high. Reports were prepared on these cases, comparing their costs with those of their colleagues and analyzing the prescriptions to show where excessive costs appeared to have been incurred. On the strength of these reports, each physician was visited by his regional medical officer, who discussed his prescribing with him. After a lapse of time, a further check was made of these physicians' prescribing costs, and it has just been reported that, of the first 200 followed up in this way, the average reduction in cost between the first and second examinations was £128 a month—equivalent to a saving of over £300,000 a year.

Since the unit was instituted in 1950, 17 cases have been referred to local medical committees for formal investigation under the appropriate regulations. Figures for the first eight of these cases show that at the first investigation the prescribing costs were on the average £668 a month higher than the average for the area. After the investigation was completed, this figure was reduced to £154 a month—a saving over the year in these eight cases of practically £50,000. In commenting on these results, the spokesman of the Ministry of Health said, "Excess cost is largely accounted for by the following: (*a*) excessive frequency in prescribing; (*b*) prescribing of standard drugs and dressings in unnecessarily large quantities; (*c*) the prescribing of expensive proprietary preparations where a less costly standard preparation might have been equally effective. Of the 17 cases so far referred, remuneration has been withheld in nine cases 'the sums ranging from £25 to £250.' . . . On these results, it can, I think, be fairly claimed that this procedure is proving effective in practice; they also illustrate the ready cooperation accorded by most doctors when the matter is brought to their attention."

**University Health Center.**—A new experimental health center sponsored by the University of Manchester has just been opened in that city. The Nuffield Trust has appropriated £30,000 to buy and adapt the premises. The Rockefeller Foundation has provided £10,000 for the equipment and has set aside an additional £20,000 to meet extraordinary expenditures during the first few years. The university is meeting the research and teaching expenses, and the city of Manchester is providing £3,500 a year to cover maintenance and the cost of the nonmedical staff. The aims of the center, which is situated in a densely populated working-class area near the Manchester Royal Infirmary, are (1) to provide first-class medical care for the inhabitants of the area; (2) to demonstrate integration of preventive and curative medicine; (3) to provide for the teaching of undergraduates; (4) to show how medical care takes into account social factors; and (5) to promote sociomedical research.

The center is staffed by four general practitioners, who were already in practice in the neighborhood and who now work as a group in the center, with three secretaries. Also, three district nurses run a treatment room for injections, minor injuries, and physiotherapy, in addition to their home nursing duties. There is a small x-ray department and a small pathology department where the more elaborate biochemical and bacteriological determinations are made. Both are staffed by the neighboring teaching hospital. Eventually each of the participating practitioners will run two sessions a week of the local authority clinics of the school medical service and maternity and child welfare service. In addition, they will run two sessions a week as clinical assistants at a local hospital. When the center is under way it is to be used as a teaching center for medical students, and for this purpose the practitioners on the staff will be recognized as approved teachers of the University Medical School.

**A Preoperative Anesthetic Outpatient Clinic.**—Since 1950, a preoperative anesthetic outpatient clinic has been held weekly at a Northamptonshire hospital (Loder, R. E., and Richardson, H. J.: *Lancet* 1:1177, 1954). The patients examined are all those (1) aged 40 and more on the surgical waiting list; (2) who are scheduled for a major operation, irrespective of age; and (3) referred by the surgeons before being placed on the waiting list. Of the patients seen since the inauguration of the clinic, 318 were considered fit for anesthesia, 22 were considered unfit for any form of anesthesia, and 142 were considered fit for some suitable form of anesthesia after investigation and treatment. Hypertension (diastolic pressure of 100 mm. Hg or more) was found in 106 patients. The advantages of the clinic are summarized as follows. To the patient, all were reassured at being pronounced fit for the operation before coming into hospital, and it was possible to answer their many questions about the operation, its effects, and their probable stay in hospital, which they had not had the opportunity of raising before. To the surgeon, he was able to plan his bed and his operating lists more reliably, because he knew that the patient coming in for operation was medically fit for it. To the hospital, the number of available beds was increased as a result of the investigations and some at least of the treatment being carried out in the outpatient department. To the anesthetist, there was leisure to examine the patients carefully and to discuss their anesthetic problems with the surgeons well in advance of the operation. The only disadvantage encountered was that, if a patient remainded on the waiting list for a long time, this might involve reexamination on admission.

**Penalizing Pharmaceutical Research.**—A leader of the pharmaceutical industry has drawn attention to the deleterious effects of the present policy of the Ministry of Health on the future development of pharmaceutical research. Referring to the "attitude of the Ministry of Health towards the cost of pharmaceuticals required by the National Health Service," Dr. Alexander Fleck, the chairman of Imperial Chemical Industries Ltd., said, "Any effort by a Government department to cut down waste and extravagance is commendable. In this instance, however, there is the serious danger that a rather unintelligent application of quite inappropriate costing methods may damage or even destroy the most vital parts of the pharmaceutical industry in this country. The danger is that pharmaceutical research may be rendered so unattractive in this country and so unprofitable that this important field of research may be abandoned by one company after another and this country may be forced to rely upon the scientific achievements of other countries."

**Mass Radiography in Scotland.**—Tuberculosis has always been more of a problem in Scotland than in England. The Department of Health for Scotland has just announced the launching of six intensive mass radiography drives in areas where the incidence of tuberculosis is particularly high. This follows the result of an experimental drive that was held in Greenock last autumn. Greenock has about 68,000 inhabitants. After a preliminary publicity campaign, with posters, movies, lectures, and announcements in schools, churches, and public meetings, two

mass miniature radiography units visited the city for a fortnight. During this time they took radiographs of 13,537 persons, almost one-fifth of the population, and it is reported that many more would have been included if the units had not had to move on to other appointments at the end of the fortnight. A diagnosis of active tuberculosis was made in 70 cases, and an additional 93 cases were considered to require observation.

**New Scottish Research Unit.**—The first specially designed research unit to be built in Scotland since the war has recently been opened in Glasgow. This is the clinical chemotherapeutic research unit in the Western Infirmary, Glasgow. It is a joint enterprise. The Western Regional Hospital Board has contributed £50,000 for the building; the Medical Research Council has provided the medical staff and the equipment; and the board of management of the Glasgow Western Hospitals has provided the nursing staff and the day-to-day services. The building contains a clinical section with 14 beds, well-equipped research laboratories, and an animal house. Emphasis will be on research in acute rheumatism and diseases of the blood.

**Institute of Urology.**—The Institute of Urology, established in 1946 as an associated unit of the British Postgraduate Medical Federation, has moved to its own premises opposite St. Peter's Hospital. The building includes a lecture room, students' common room, museum, laboratories, library, photographic room, and artist's studio. Additional laboratory facilities will shortly be available in the neighboring St. Paul's Hospital. A total of 138 beds is at its disposal at St. Peter's, St. Paul's, and St. Philip's hospitals, and, in addition, it has links with the Royal Cancer Hospital and, for work on tuberculosis, with Harefield Hospital.

**Sponsored Television.**—The following excerpt is from the annual report of the General Medical Services Committee of the British Medical Association. "In view of the many exhortations which are made to reduce prescribing costs the Committee felt apprehensive at the possible effect of sponsored television on the public demand for various proprietary medicaments and the consequent rise in the Drug Bill. Accordingly, the Committee drew the Ministrys attention to this problem."

## PERU

**Plan for Postgraduate Medical Study.**—The Faculty of Medicine of the National University of San Marcos has approved a plan to promote postgraduate medical study in all parts of Peru. This teaching program will include periodically sending professors to several cities to give special courses on medical subjects. These will be scheduled beforehand. Improved courses in several specialties will be organized annually in Lima. These will last a month and will be attended by physicians from all parts of the country. The first of these courses will be given in Arequipa from July 31 to Aug. 8 by 20 professors from the medical school in Lima headed by Dean Oswaldo Hercelles Garcia. Courses in medicine, surgery, psychiatry, pediatrics, neurological pathology, and infectious and tropical diseases will be given. The surgeons on the team will give surgical demonstrations at the hospital during the mornings and lectures in the afternoons. The main purpose of this plan is to develop a greater human and scientific bond not only between the school and its ex-students but also among all the physicians of the country and to keep the faculty in close touch with the medical problems of the nation, particularly those related to some regions with particular endemic diseases.

## TURKEY

**Treatment of Trachoma.**—In the *Journal of Health,* Prof. N. Sezer of Istanbul reported the effects of antibiotics on trachoma among hospital patients and school children. Of 550 children who had trachoma 250 were given oxytetracycline (Terramycin), 250 chloramphenicol (Chloromycetin), and 50 chlortetracycline (Aureomycin). Some patients were given eyewash and some were given capsules. Most of the patients received either 0.5% chlortetracycline, 0.5% oxytetracycline, or 1% chloramphenicol ointment to be rubbed on the lesions five times daily. Seventy per cent of the patients with primary acute trachoma who were given chloramphenicol, and 60% of those who were given oxytetracycline or chlortetracycline ointment recovered; 40 to 50% of those with chronic trachoma who were treated with chlortetracycline, 32 to 55% of those treated with chloramphenicol, and 15 to 20% of those treated with oxytetracycline ointment recovered. Although clinical symptoms sometimes persisted, laboratory investigation showed that in every case these antibiotics had eliminated the causative agent. Chloramphenicol was given orally as an adjunct. The less water-soluble chloramphenicol gave more satisfactory results than the more water-soluble drug, and it remained longer in the conjunctival sac. During the first 10 days of treatment marked amelioration was observed in patients with pannus, superficial keratitis, and acute trachoma. Subjective symptoms completely subsided.

In two or three weeks lesions subsided in patients with acute follicular trachoma without leaving scars. A smooth, red membrane formed at the fornix and tarsus. The formation of new reticulation occurred in 15 to 20 days after the termination of therapy. In patients with chronic trachoma satisfactory results were promptly obtained with chlortetracycline or chloramphenicol, but when oxytetracycline was given two or three months elapsed before the infiltration of the fornix was absorbed. In patients with papillar hypertrophy the papillas were completely absorbed within one or two weeks when treated with chlortetracycline or chloramphenicol, but with oxytetracycline therapy there was no improvement. Local application did not give satisfactory results when hardening of the tarsus had occurred. Although resistance to opening of the eyelids improved, hardness of the tarsus decreased, and marked improvement of conjunctival symptoms was observed, most of the patients had recurrences. Chloramphenicol given orally as an adjunct proved beneficial, but the other two drugs did not. When patients with acute trachoma were given chloramphenicol or chlortetracycline, laboratory investigation revealed that the inclusion bodies in the epithelial cells rapidly decreased during the first four days of treatment, and the epithelial cells and polynuclear leukocytes became normal with a week. In chronic trachoma Ziya Gün cells disappeared during the first week of the therapy and Leber's cells at the end of the second week. When oxytetracycline was given these cells disappeared only after two to three months.

According to reports received by the Ministry of Health from Gaziantep, Diyarbakir, Urfa, Adana, Mardin, and Kilis, when acute and chronic trachoma are treated with 0.5% oxytetracycline or chlortetracycline five times daily, lacrimation and photophobia subside during the first few days of treatment. When the disease is complicated with follicular conjunctivitis or papillar hypertrophy, two to three months are required to achieve this result. Patients with keratitis, corneal complications, and acute conjunctivitis recover in a few days. For acute trachoma, the oxytetracycline ointment is preferred, and, for conjunctivitis, herpes simplex, and seasonal ophthalmia caused by the Koch-Weeks bacilli, chlortetracycline is preferred.

Trachoma was endemic in the eastern and southeastern provinces of Turkey before World War I, and it became epidemic as the result of movements of troops through Iraq, Transjordan, Saudi Arabia, Syria, and Palestine. In 1927 a survey sponsored by the Ministry of Health and Social Assistance revealed that in some localities the incidence was 10 to 30% and in others 70 to 80%. With a small staff of specialists, six 100-bed hospitals, and six dispensaries, a trachoma campaign was started in 1930. More than half of the 78,620 persons examined were in need of treatment. In 1948 there were 38 25-bed hospitals, 38 dispensaries and 107 village units. Of 96,309 persons examined 55% were found to be infected and 1.5% were blind. A total of 6,527,455 treatments were given. Although the trachoma campaign has resulted in a lowering of the incidence of trachoma and blindness, trachoma is still endemic in the eastern and southeastern provinces. Health education and Marshall aid mobile units visit distant villages. The 1935 census revealed 50,732 blind persons (23,500 male and 27, 232 female). According to the 1950 census the total number of blind persons has been reduced to 32,668. Most of these are in rural communities; 4,250 are congenitally blind, and most of the rest are blind as a result of trachoma. Other causes include syphilis, gonorrhea, and injuries.

# CORRESPONDENCE

## MEDICAL LIBRARIES

*To the Editor:*—The article "How to Keep Up with Medical Literature" in the April 24, 1954, issue of THE JOURNAL, page 1409, refers to restrictions on the use of certain medical libraries. The larger problem, of which this is but a part, deserves careful consideration. The fact of the matter is that most of the medical societies, although they derive the major portion, or all, of their financial support from their members, open their libraries to all. Many of them are the strongest medical research libraries in their areas. The real problem here is the provision of adequate income for libraries that open their reading rooms to the public but that are maintained by a small group.

The library of the College of Physicians of Philadelphia, for instance, finds that the fellows of the college constitute a small minority of the active library users. Throughout the years the fellows have been happy to provide this research tool for all workers in the medical sciences. Yet it must be recognized that the staggering growth of medical literature in the last 25 years and rising costs in all operational areas has outstripped the ability of any limited number of society members to sustain a major medical research collection. Medical society libraries are faced with the alternatives of seeking outside help and larger endowments or of curtailing their standards of service. Ironically enough, the large governmental and private grants in support of medical research have increased the demands made on these libraries, although none of the money goes to them.

During the month of April, the library of the College of Physicians of Philadelphia loaned 277 volumes to 7 medical schools, 12 hospitals, 4 government libraries, 6 nonprofit research agencies, 11 commercial organizations, and 11 institutions of higher learning. These libraries were in 10 different states and the District of Columbia. In the Philadelphia area, the medical schools have repeatedly acknowledged their appreciation of having the facilities of a large medical research library accessible to their students and faculties. The college has been fortunate in securing the generous support of local pharmaceutical companies and other related commercial enterprises that constantly use the library's services. However, the total income to the library from outside sources is less than 10% of the operating costs of the library.

Because this problem is of primary concern to the medical profession, constructive thought should be given to ways of increasing the general support for these libraries that are so essential to medical progress. Consideration might be given to the appropriateness of financial support for these libraries from professionally supported sources. The continued existence and even higher levels of service of these libraries to the entire medical profession would thus be assured, and the libraries would then be better able to help the physician keep up with medical literature.

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## MATERNAL AND FETAL FACTORS IN EPILEPSY

*To the Editor:*—I read with great interest the article by Drs. Lilienfeld and Pasamanick entitled "Association of Maternal and Fetal Factors with the Development of Epilepsy" in the June 19, 1954, issue of THE JOURNAL. My own experience with a group of epileptic patients from the seizure unit at Milwaukee County General Hospital and from my private practice corroborates their findings. Although I do not have access to prenatal and paranatal records of the children born in Milwaukee, I do have postnatal information concerning these patients. There is little question that the complications of pregnancy, prematurity, and asphyxia livida and pallida account for many cases of epilepsy. In all of these instances, careful checking revealed no epilepsy in the families of any of these patients. I believe there are fully as many epileptic children whose parents have no history of epilepsy as there are whose parents do have such a history.

In Wisconsin, a special division is making an exhaustive study into the causes and prevention of complications of pregnancy and labor. There is little question that the mortality rate is too high and the cause should be determined. The influence of heredity as a cause of epilepsy appears to be less and less a factor, as the studies of such men as Aelstron, Lennox, Aird, and the authors of the above mentioned article indicate.

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## INTRA-ARTICULAR INJECTION OF HYDROCORTISONE

*To the Editor:*—Intra-articular injections of hydrocortisone have now been given in more than 17,000 instances to more than 1,300 arthritic patients at the Hospital of the University of Pennsylvania. Only simple, but careful, "instrument technique" and aseptic precautions were used. In four instances, septic arthritis resulted; this was easily controlled by prompt and adequate antibiotic therapy. The incidence of joint infection in this series, therefore, is less than 1 in 4,000 injections.

So that the recent letter published in THE JOURNAL for June 5, 1954, page 597, will not cause undue alarm concerning the dangers of this method, I have cited the above statistics. Careful attention to sterilization of the skin overlying the joint and of the syringe and needle to be used are essential, but drapes and gloves have not proved necessary and only make the procedure more complicated.

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## BELLADONNA DRUGS IN CHOLINERGIC POISONING DURING TREATMENT OF MYASTHENIA GRAVIS

*To the Editor:*—Since the introduction of neostigmine in 1934 by Mary Walker in the treatment of myasthenia gravis, various other anticholinesterase (cholinergic) drugs have been used in the treatment of this disease with varying success. Some of these, such as diisopropyl fluorophosphate (DFP), tetraethyl pyrophosphate (TEP), and octamethyl pyrophosphoramide (OMPA), produced long depression of the serum cholinesterase, depression lasting for from several days to several weeks. The most successful for treatment of myasthenia was octamethyl pyrophosphoramide, but this drug is no longer available because of the tremendous difficulties and dangers in its manufacture. With all of these drugs, as well as with neostigmine, the side-effects of intense stimulation of the gastrointestinal tract made it difficult to obtain a good therapeutic result in some patients unless belladonna derivatives were given with each dose of the anticholinesterase compound. When this was done, the gastrointestinal effects disappeared, but at the same time the warning sign of excessive stimulation was removed. It is well known that all of these drugs have a sharp critical point of maximum effectiveness in myasthenia gravis. Above this point symptoms of cholinergic poisoning appear and produce paralysis of the voluntary muscles that may be far more serious than myasthenia gravis itself.

The first warning signal of this impending cholinergic muscular paralysis is the stimulation of the gastrointestinal tract; therefore, it is essential not to obscure this important sign by masking it with regular doses of belladonna. Weakness due to excessive amounts of anticholinesterase drugs (cholinergic crisis)

is usually accompanied by severe gastrointestinal stimulation, excessive salivation, pallor, cold sweating, urgency, fasciculations of the voluntary muscles including those of the tongue, shoulder, neck, and arms, constriction of the pupils, increase in blood pressure with or without slowing of the heart, subjective sensations of internal trembling, and, often, severe anxiety and panic. The weakness and paralysis of myasthenia gravis insufficiently treated by anticholinesterase drugs is not accompanied by any of these symptoms, except the last two, namely, the subjective ones. When atropine is not given to a patient with myasthenia gravis, the differential diagnosis between these two serious paralyses is usually not difficult to make.

With all the obvious overactivity in the parasympathetic system that is encountered in cholinergic overdosage and not masked by atropine, there is little desire on the part of the patient to take more of this drug, and the physician is clearly warned not to give more. On the other hand, in the presence of substantial amounts of belladonna derivatives (an equivalent of 0.5 mg. of atropine every three or four hours), the gastrointestinal, secretory, and cardiac symptoms may be entirely obscured. The fasciculations and the muscular weakness are all that remain. Under such circumstances, a physician not familiar with the seriousness of overdosage of cholinesterase compounds may unwisely prescribe more and cause death.

These serious phenomena are not a problem in patients with mild myasthenia gravis who are receiving small to moderate amounts of both belladonna and cholinergic drugs. Nor are they a problem to an experienced patient or clinician both clearly aware of the danger of taking even a small excessive amount of the myasthenia remedy. Most patients with myasthenia gravis tolerate neostigmine or other compounds by mouth and do not require belladonna derivatives. In special situations in which these are necessary, they should be given as sparingly as possible, and extra care should be given to watching for the masked signs of cholinergic overdosage. It is particularly important when adjusting the dosage of a new drug or when increasing the dosage of an old one that the masking effect of belladonna derivatives be reduced to a minimum. Some physicians believe that it is wiser to give the belladonna derivatives only when gastrointestinal side-effects appear than to give them in regular amounts with each dose of the anticholinesterase drugs. When symptoms of cholinergic poisoning do occur, use of the drug should be stopped immediately and no more should be given until the toxic symptoms have disappeared. In addition, a large intravenous dose of atropine sulfate, 1 to 3 mg., may be given as an emergency measure and the respirator and other mechanical aids used if necessary.

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## ANTIBIOTIC THERAPY AND ENDAMEBA HISTOLYTICA INFECTION

*To the Editor:*—During a period of about one year, covering parts of 1952 and 1953, the parasitology laboratory of the Veterans Administration Hospital, Long Beach, Calif., examined 5,031 stool specimens from 1,773 patients and staff members. The incidence of Endameba histolytica infection in this group was 1.3%, or 23 cases. This is quite low in comparison with the average incidence of 8.1% obtained by Craig and Faust (Clinical Parasitology, ed. 5, Philadelphia, Lea & Febiger, 1951, p. 72) in an analysis of 40 different American surveys covering the period from 1916 to 1942 and also in relation to a reported incidence of 3.3% in a group of 2,016 adults and children in the Los Angeles area (Kessel and Sinitsin: *J. Parasitol.* **24**:433, 1938).

Although we have no accurate statistics covering the incidence of infection in previous years at this hospital, we believe that recently it has fallen off fairly markedly. This impression has been strengthened by similar observations in other laboratories of this area. In New Orleans, statistics on amebic infection have been kept by Faust and his group over a period of years. Dr. Faust told us that in the past 20 years the incidence of E. histolytica infection has fallen from 10 to about 2% in the obstetric wards of the Charity Hospital and from 8 to 1% among Tulane University medical students. It seems doubtful that either increased efficacy of antiamebic treatment or improvements in general sanitation have greatly reduced the prevalence of this parasite, but the increasingly widespread use of broad spectrum antibiotics, such as oxytetracycline (Terramycin) and chlortetracycline (Aureomycin), might incidentally effect such a reduction because of their amebicidal activity.

In an attempt to investigate this possibility, the case histories of 22 of our patients with a positive diagnosis of E. histolytica infection were reviewed and compared with the case histories of 100 patients who had had at least four negative stool examinations, but who were otherwise unselected. None of the 22 had received any broad spectrum antibiotic therapy. Of the 100, 12 had received antibiotic therapy just prior to hospitalization or had begun to receive antibiotics in the hospital prior to the time their stools were first examined. Four others had histories of previous treatment for amebiasis. It is seen that, in contrast to the patients who had positive stools but no history of antibiotic therapy, at least 12% of the patients who had negative stools had received antibiotic therapy in the immediate past or were currently receiving it.

These figures, while by no means conclusive, suggest that the reduction in numbers of positive stool examinations for E. histolytica may be due in part to antibiotic therapy for other conditions, and they raise the much more serious question as to whether sporadic or inadequate treatment with these drugs may mask an infection still present but not eradicate it entirely.

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## MALARIA IN PUERTO RICO

*To the Editor:*—On reading THE JOURNAL of April 24, 1954, I came across the article by Capt. C. P. Archambeault on mass antimalarial therapy in veterans returning from Korea. Capt. Archambeault states at the end of his article that 100,000 to 200,000 Puerto Ricans arrive in New York City each year and that many of these persons harbor malaria parasites. This statement is erroneous, as malaria was practically eradicated from Puerto Rico about five years ago. Since then there has been almost no mortality from this disease in the island.

I am pleased to quote a table appearing in the "Annual Report of the Commissioner of Health of Puerto Rico for the Fiscal Year 1950-51" (page 118), which reads as follows:

*Bureau of Malaria and Insects Control: Malaria Morbidity and Mortality in Puerto Rico—1941-1950*

| | Morbidity | | Mortality | |
|---|---|---|---|---|
| Year | Cases | Rate * | Deaths | Rate * |
| 1941 | 23,471 | 1,228.7 | 2,383 | 124.9 |
| 1942 | 21,391 | 1,009.8 | 1,933 | 99.4 |
| 1943 | 16,032 | 810.3 | 1,166 | 58.9 |
| 1944 | 11,209 | 557.1 | 1,004 | 49.9 |
| 1945 | 6,168 | 301.5 | 881 | 43.1 |
| 1946 | 5,584 | 268.5 | 672 | 32.3 |
| 1947 | 3,915 | 185.3 | 423 | 20.0 |
| 1948 | 1,299 | 60.5 | 253 | 11.8 |
| 1949 | 353 | 16.2 | 92 | 4.2 |
| 1950 | 73 | 3.3 | 57 | 2.6 |

* Rate per 100,000.

In the latest report of the Commissioner of Health of Puerto Rico for the fiscal year 1951-1952, a chart shows in a graphic way the sharp decline of malaria mortality and morbidity in Puerto Rico from 1932 to 1951; a rate of 3.5 for the latter and 1.5 for the former per 100,000 inhabitants, in the last mentioned year. In 1951-1952 only 1.1% of all the blood smears made for malaria parasites in the island were positive.

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# GOVERNMENT SERVICES

## ARMY

**President of Association of Clinical Chemists.**—Lieut. Col. Monroe E. Freeman, M.S.C., has been elected president of the American Association of Clinical Chemists for 1954-1955. His present Army assignments are chief, medical allied science section of the Medical Service Corps, and staff assistant in the office of the chief of staff, where he is engaged in work connected with scientific research and development. Colonel Freeman received a degree of B. S. in chemistry and mathematics (1928) from the University of Minnesota, Minneapolis, where he also received degrees of M.S. (1929) and Ph.D. (1931) in biochemistry. He has been an instructor at the University of Arizona, Tucson; assistant professor at the University of Maine, Orono; and professor at the University of Massachusetts, Amherst. He was first commissioned a lieutenant in the Sanitary Corps of the Army in 1942. He is a member also of Sigma Xi, the American Chemical Society, the American Association of Advanced Science, the Society of Experimental Biology and Medicine, the Washington Academy of Science, and the Diplomate American Board of Clinical Chemists, and is the American representative (1954), International Federation of Clinical Biochemists. His son will enter Georgetown University, Washington, D. C., in the fall as a premedical student.

**War College Graduates.**—Among the graduates of June 10 from the Army War College, Carlisle Barracks, Pa., were five Medical Corps colonels and one Medical Service Corps lieutenant colonel. Each of the six is an overseas veteran of World War II and three, of Korea as well. They are Colonels Raymond H. Bunshaw, now assigned to U. S. Army Forces in Europe; John B. Coates Jr., assigned to Walter Reed Army Medical Center, Washington, D. C.; Otis W. Snyder, assigned to Fort Sam Houston, Tex.; Byron L. Steger, assigned to Armed Forces Institute of Pathology, Washington, D. C.; John H. Taber, M.C., assigned to the Armored School, Fort Knox, Ky.; and Lt. Col. Rufus D. Huff, M.S.C., assigned to the Surgeon General's Office, Washington, D. C.

## NAVY

**Three Anniversaries in August.**—Naval medical installations throughout the world will commemorate three milestones in the history of the Medical Department of the Navy during the month of August: The 112th anniversary of the establishment of the Bureau of Medicine and Surgery, one of the five original bureaus of the Navy department, on Aug. 31; the 42nd anniversary of the Navy's Dental Corps, on Aug. 22; and the 7th anniversary of the medical department's youngest corps, the Medical Service Corps, on Aug. 4.

Although the Bureau of Medicine and Surgery was established on Aug. 31, 1842, the history and traditions of the Medical Department of the Navy and the accomplishments of medical personnel begin with the history of the American nation. Among the officers of the fleet commanded by Esek Hopkins, the only Naval officer to bear the title of Commander-in-Chief of the United States Navy, the name of Joseph Harrison, surgeon, appears as on board the Alfred, the vessel on which John Paul Jones hoisted the first American flag flown by an American man-of-war. It is highly probable that other surgeons sailed with this fleet, for the Act of 1775 made provision for the payment of four shares of prize money to the surgeons of this squadron. The Act of Jan. 6, 1776, allotted certain surgeons and surgeon's mates to each armed vessel. A register of the Navy published in 1800 lists the names of 35 surgeons and 28 surgeon's mates.

In an Act Establishing Navy Hospitals approved February 26, 1811, the Commissioners of Navy Hospitals were authorized to procure proper sites for Navy hospitals and to erect suitable buildings thereon if they were not procured with the land. It was not until 1821 that the first site for a Navy hospital was acquired in Washington, D. C. This was followed by the purchase of other sites at Chelsea, Massachusetts, in 1823; Brooklyn, New York, in 1824; Philadelphia, Pennsylvania, in 1826; and Norfolk, Virginia, in 1827. Early in 1827, construction of the first naval hospital at Norfolk, Virginia, and the Naval Asylum at Philadelphia began. In 1932, the Congress abolished the Commissioners of Navy Hospitals and designated the Secretary of the Navy as the sole trustee of the Naval Hospital Fund. When the Bureau of Medicine and Surgery was established in 1842, Surgeon William Paul Crillon Barton was selected by the Secretary of the Navy as the first Chief.

The need for dental surgeons began to be officially recognized as early as 1870. Surgeon General Rixey urged the creation of a Naval dental corps and pressed for enactment of legislation, but it was not until Surgeon General Stokes' administration that the bill creating the Dental Corps was passed. The Dental Corps was established on Aug. 22, 1912.

On Oct. 22, 1945, Vice-Admiral Ross T. McIntyre, Surgeon General of the Navy, urged that legislation "intended to keep the Medical Department abreast with the Navy and with the accomplishments and plans of the Medical Departments of other Federal Services" be expedited. He requested that the hospital corps bill and the proposal to establish a medical allied science corps in the medical department be given early consideration. Public Law 337, 80th Congress, known as the Army-Navy Medical Service Corps Act of 1947, was passed, and on Aug. 4, 1947, the Medical Service Corps joined the medical, dental, hospital, and nurse corps to form the five-corps Medical Department of the Navy.

**Personal.**—Captains Oliver A. Smith and William E. Pinner, M.C., who had completed a total of 61 years of Naval Service, were placed on the retired list on July 1.

## VETERANS ADMINISTRATION

**Residency Training.**—A residency training program and other professional educational training was instituted at the VA hospital, East Orange, N. J., about July 1. Residency training is offered in general surgery, otolaryngology, orthopedics, neurology, physical medicine and rehabilitation, anesthesiology, urology, pathology, internal medicine, and radiology. Part of this residency program will be taken in collaboration with a number of local hospitals and medical teaching institutions. The full-time staff is experienced in teaching residents; most of the members are certified by various American boards, and those who have not yet been certified have met the requirements of certification. Dr. J. A. Rosenkrantz, Chief, Professional Services, Veterans Administration Hospital, East Orange, N. J., is the administrative officer in charge of the residency training program.

**Disability Incurred While Reporting for Induction.**—Inductees of the Korea period who did not enter on active duty status and their dependents may be eligible for certain benefits under a new law, VA has announced. Public Law 463, signed June 30, 1954, extends compensation and certain related benefits to persons who have incurred disabilities while reporting for induction on or after June 27, 1950, and to their dependents, on the same basis as has been authorized for inductees of World Wars I and II. These benefits are compensation for service-connected disabilities or death resulting from these disabilities and for hospital and outpatient treatment for such disabilities. The law stipulates that any person who, on or after June 27, 1950, suffers a disability in line of duty and not as the result of his or her own misconduct while en route under orders to report to a place for final acceptance, induction, or entry upon active duty, or while at such place or en route home, shall be considered to have incurred such disability in the active military or naval service.

# MEDICAL LITERATURE ABSTRACTS

## INTERNAL MEDICINE

**Effects of Licorice Extract.** E. Schulze, R. Franke and N. Keller. Deutsche med. Wchnschr. **79:**716-719 (April 23) 1954. (In German.)

Licorice extract (succus liquiritiae), in doses of 20 to 25 gm. of commercial licorice sticks dissolved in a glass of hot water, was given daily for six weeks to 116 patients, 38 of whom had gastric ulcer, 61 duodenal ulcer, and 17 chronic gastritis. The patients had to take several drinks after each meal until the glass was emptied in the evening. The only dietetic restriction consisted of limiting the ingestion of salt to 5 gm. per day. A diet rich in proteins and vitamins was preferred. For the first two weeks of the treatment, the patients were kept in bed. In 32 of the 38 patients with gastric ulcer, healing of the ulcer was demonstrated roentgenologically; of the remaining 6 patients, 3 were free of subjective complaints, but a residual "niche" was observed even after treatment was continued for a longer time. Three patients in whom the size of the niche remained unchanged after four weeks of treatment were operated on, and carcinomatous ulceration was found. Malignant degeneration must be suspected in patients whose niche does not respond to treatment with succus liquiritiae. Of the 61 patients with duodenal ulcers, 25 had symptoms and roentgenologic evidence of recent ulcers without deformity of the duodenal bulb. Eighteen of these made a complete recovery, while seven had a residual niche but were free of complaints. In the remaining 36 of the 61 patients with a long history of duodenal ulcer and a deformed duodenal bulb and in the 17 patients with chronic gastritis therapy failed. Undesirable side-effects of the treatment were not observed. Sucsan, a purified preparation of the effective substances of licorice root, particularly of glycyrrhizic acid, and crude ammonium glycyrrhizinate, respectively, were given in daily doses of 0.9 to 1.2 gm. and 1.8 to 2.4 gm. respectively to 103 patients, 34 of whom had gastric ulcer, 57 duodenal ulcer, and 12 gastritis. Healing of the ulcer took place in 29 of the 34 patients with gastric ulcer, while a small residual niche remained in 5. Recurrences occurred in seven patients within 4 to 11 months. Results obtained in the patients with duodenal ulcer and in patients with chronic gastritis corresponded to those obtained with succus liquiritiae, but in contrast to the crude drug, Sucsan did not cause irritation of the jejunal mucosa. The therapeutic effect of Sucsan depends primarily on the concentrated glycyrrhizic acid. Its glycyrrhetinic acid component has a desoxycorticosterone acetate-like effect as was demonstrated experimentally in rats and in two patients with Addison's disease whose mineral metabolism balance was maintained with succus liquiritiae, ammonium glycyrrhizinate, and Sucsan for about two years.

**White Nails in Hepatic Cirrhosis.** R. Terry. Lancet **1:**757-759 (April 10) 1954.

This report is concerned with opacity of the nail bed causing apparent whiteness of the fingernails. Fully developed white nails exhibit a ground glass-like opacity of almost the entire nail bed. It extends from the base of the nail, where the lunula is indistinguishable, to within 1 or 2 mm. of the distal border of the nail bed, leaving a distal zone of normal pink. The condition is bilaterally symmetrical, with a tendency to be more marked in the thumb and forefinger. White nails were found in 82 of 100 consecutive patients with cirrhosis. The cause of the cirrhosis was alcoholic in 91, postnecrotic in 7, and cholangiolitic in 2 patients. The 18 patients without white nails were in the alcoholic group. White nails are easily overlooked; it is suggested that they are endocrine stigmata, comparable with spider nevi, palmar erythema, cutaneous striae, and gynecomastia. White nails are apparently rare in healthy adults, and, therefore, their detection may be of some importance.

**Renal Biopsies in Hypertension.** R. H. Heptinstall. Brit. Heart J. **16:**133-141 (April) 1954.

Biopsy specimens of renal cortex obtained at operation from 50 patients with hypertension subjected to sympathectomy, associated in some cases with partial adrenalectomy, were found to give a fairly accurate picture of the state of the arterioles and small arteries and to provide an adequate basis for the diagnosis of renal disease, except in chronic atrophic pyelonephritis. The belief that hypertension precedes vascular change in essential hypertension was supported by the fact that the changes found in 30 of the 50 specimens were slight (one showed no change). Arteriolar necrosis was present only in the patients with the highest levels of blood pressure. Correlation of the vascular changes, graded according to their severity, with the effects of surgical treatment after a follow-up of from one to nine years showed that the reduction in blood pressure obtained in some patients with advanced changes was as great as that obtained in others with little or no change. Low-grade changes do not in themselves guarantee a satisfactory response to sympathectomy. Subdivision of the material according to the operation used (thoracolumbar sympathectomy of the Smithwick type or the more conservative lumbar sympathectomy with or without partial adrenalectomy) was not feasible because of the small number of cases under review, but some of the better results were found to be associated with the more limited type of sympathectomy.

**Emergency Treatment of Bleeding Esophageal Varices: Treatment by Transesophagoscopic Sclerosing Injection Plus Pneumatic Tamponade.** E. D. Palmer. A. M. A. Arch. Otolaryng. **59:**536-542 (May) 1954.

Eight patients with massive hematemesis were found esophagoscopically to be bleeding from previously undetected esophageal varices and were treated on the spot by intravariceal injection of sodium morrhuate and simultaneous pneumatic tamponade. This emergency therapy was intended to assist control of hemorrhage until surgical portal decompression could be accomplished. Hemorrhage was satisfactorily controlled through the period of definitive surgery in three cases. The patients required an average 1,170 ml. of whole blood replacement for that lost between the time of injection and operation. The five other patients died from 2½ to 21 days after sclerosing injection, before surgery could be done. All deaths were due to liver failure, none to exsanguination. Altogether there was no significant bleeding after injection in five of the eight patients. Histological examination of four esophagi obtained at autopsy failed to reveal evidence of varix obliteration. A control group of 17 patients, first found to have esophageal varices by esophagoscopy at the time of hemorrhage, were treated by immediate pneumatic tamponade as the only local therapy. Eight were controlled sufficiently well to permit definitive surgery but required an average of 10,090 ml. of blood to replace that lost between institution of tamponade and surgery. Nine patients died as a result of hemorrhage, three from exsanguination, and six from liver failure. Because of the vicissitudes of varices and of hemorrhage in the cirrhotic patient, it is believed that the two groups are not comparable for deciding the usefulness of adding sclerosis to tamponade for emergency control of bleeding varices. Nevertheless, the present experience suggested that, however effective tamponade may be made for immediate control, addi-

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tion of sclerosing injection helps reduce the amount of blood lost during the dangerous period between the time that tamponade must be discontinued and definitive surgery can be accomplished. The fate of the injected sodium morrhuate is yet to be determined.

**Medical Treatment of Arterial Hypertension: Pentapyrrolidin Bitartrate (Ansolysen) New Agent for Oral Therapy.** V. Rønnov-Jensen. Ugeskr. laeger **116**:551-558 (April 15) 1954. (In Danish.)

In spite of considerable drawbacks, pentapyrrolidin bitartrate (Ansolysen) is regarded as the best agent to date for the treatment of hypertension. The treatment must be individualized and is not infrequently time-consuming. It should probably be applied in all cases of marked fixed hypertension, provided the patients will cooperate. Grave hypertensive heart disorders with decompensation are considered compulsory indications, and the treatment often results in dramatic improvement. The main contraindications are recent coronary and cerebral thromboses and hypertension due to coarctation of aorta, aortic insufficiency, or pheochromocytoma. Except in cases of graver arteriosclerosis or greatly reduced renal function, the purpose should be to achieve the greatest reduction in blood pressure compatible with the patient's well-being. Pentapyrrolidin can be used on far wider indication than can operative treatment. In the general practice, restraint is advised in the use of the drug, as it is not without danger in inexperienced hands. To what extent it ought gradually to replace sympathectomy can be determined only when late results are known. Of 48 patients given pentapyrrolidin orally, 33, aged from 41 to 77, all with grave hypertension, had not previously been treated for hypertension. Two died from causes not attributable to the treatment, 4 discontinued treatment, and 27 have been treated for from one and a half to seven and a half months. The average blood pressure reduction was 50 to 20 mm. in the erect position and 35 to 15 mm. in the recumbent position. Subjective symptoms disappeared or were lessened. In some cases improvement occurred in the objective symptoms. In 15 patients given combined oral and parenteral hexamethonium (Vegolysen) treatment for at least a year before the start of pentapyrrolidin treatment this treatment for from one to seven months resulted in reduction of blood pressure and side-effects about as on hexamethonium treatment, but in seven cases the general condition was better than on treatment with hexamethonium.

**Hexamethonium in Treatment of Acute Hypertensive Crises Illustrated by Case Reports.** V. Rønnov-Jensen. Ugeskr. laeger **116**:558-560 (April 15) 1954. (In Danish.)

In acute pulmonary edema in patients with hypertension hexamethonium (Vegolysen) is indicated only for patients in whom the usual methods of treatment have failed or for those in whom venesection, otherwise indicated, cannot be undertaken because of anemia and should apparently be given only as part of the usual treatment with saccharose, oxygen, and morphine. In hypertensive patients with cardiac asthma, the administration of hexamethonium often has a striking effect on the dyspnea and the patients can infrequently be assured of undisturbed night's rest. In grave cases of acute hypertensive encephalopathy, hexamethonium treatment may sometimes give dramatic results when routine treatment with sedatives, vasodilator agents, and venesection has failed. Cases of acute pulmonary edema and cardiac asthma and angiospasm, all successfully treated with hexamethonium, are described in detail.

**Cervico-Facial Actinomycosis.** D. E. Brannin. J. Oklahoma M. A. **47**:121-123 (May) 1954.

Brannin says that a positive diagnosis of actinomycosis can only be made from isolation of anaerobic Actinomyces from infected tissue or pus. The presence of "sulfur granules" while helpful is not diagnostic. The demonstration of mycelial fibers within a granule is highly suggestive but not conclusive, since Nocardia also presents such a picture. A presumptive diagnosis of actinomycosis, however, is usually made, if sulfur granules are present and if gram-positive mycelia can be demonstrated in these granules. In the patient whose case is presented, the right mandibular molars had been extracted about two and one-half months before. After these extractions, the "lower jaw swelled" and incision and drainage was done. Two injections of penicillin and 12 tablets of penicillin were given, and his condition improved until 10 days later when a "swelling like a hard rubber ball" developed just below the right mandible. The man was hospitalized for eight days, during which time he received four injections of penicillin a day and application of warm, moist packs. His condition improved, but the swelling did not completely resolve. He was discharged and informed that he could expect the swelling to disappear completely within a few days. When the patient was admitted again, 100,000 units of penicillin was given every four hours. Aspiration of the mass was followed by incision and drainage. Seropurulent material was subjected to bacteriological study, and jelly-like granulation tissue was studied microscopically. Cultures yielded Actinomyces bovis. The postoperative course was uneventful. Moist packs were applied for three days, at which time drainage ceased and the drain was removed. Treatment with penicillin was continued with injections of 300,000 units every 12 hours. The patient was discharged as cured 30 days after admission. Three months later no evidence of recurrence was found. Penicillin and, more recently, chlortetracycline (Aureomycin) and oxytetracycline (Terramycin) have proved effective in actinomycosis. Incision and drainage followed by curettage in combination with large doses of penicillin for three to six weeks is the treatment most universally employed at the present time in cervicofacial actinomycosis.

**Hemorrhagic Fever: A Study of 300 Cases.** G. M. Powell. Medicine **33**:97-153 (May) 1954.

Hemorrhagic fever was first studied by Western physicians when it appeared among United Nations personnel in Korea during 1951. The Japanese and Russians observed it in Manchuria and Siberia from 1932 to 1944. The endemic region in Korea was limited to a small rural area. The greatest number of cases appeared during the late spring, early summer, and late fall. Observations on 300 cases with 9 deaths revealed that the disease has three stages: the invasive, the toxic, and the convalescent stages. The invasion was characterized by high fever. The toxic stage presented shock initially and renal failure later, accompanied by a hemorrhagic diathesis, cerebral toxicity, and gastrointestinal dysfunction. The most significant laboratory findings were albuminuria, oliguria, and hypostenuria; azotemia with hyperpotassemia; leukocytosis with leukemoid reaction and atypical lymphocytes; hemoconcentration; rapid sedimentation rate; thrombocytopenia; prolonged bleeding time; and increased capillary fragility. The convalescent stage was characteristic of recovery from illness. Polyuria was the most persistent finding. Laboratory abnormalities, except for the rapid sedimentation rate and hyposthenuria remaining as long as 16 weeks, disappeared early in convalescence. The incubation period averaged from two to three weeks. The diagnosis does not become apparent until the onset of the toxic stage. The mortality rate in 1951 was 7.37% and in 1952 about 5%. With rare exceptions, convalescence resulted in complete recovery; neither relapse nor reinfection was observed. The fundamental pathological change in hemorrhagic fever is that of vascular damage evidenced by generalized arteriolar and capillary dilatation associated with capillary engorgement, rupture, and increased permeability. Though widespread, this process is most pronounced in the kidneys, pituitary, heart, lungs, stomach, intestines, and retroperitoneal region. The kidney shows a pale swollen cortex and an intensely congested and hemorrhagic medulla. The right atrium of the heart and anterior lobe of the pituitary showed hyperemia and hemorrhage. The mesenteric, retroperitoneal, and mediastinal tissues were edematic. Physiological abnormalities are mainly the result of widespread arteriolar and capillary damage probably by the disease agent or a toxin. Hemorrhagic lesions are the result of increased capillary fragility and thrombocytopenia. The Japanese and Russians independently furnished experimental evidence that the causative agent is a filtrable virus. American workers have been unable as yet to find a suitable laboratory host for the agent. Studies indicate that hemorrhagic fever in Korea is a "place" disease, not a

contagious disease. A specific therapeutic agent has not been discovered. Shock, causing death early in the disease, was most responsive to the continuous intravenous administration of arterenol (Nor-Epinephrine) combined with serum albumin. Renal shutdown, responsible for most deaths late in the disease, appeared best managed with the accepted medical regimen for lower nephron nephrosis.

**Viomycin Therapy in Human Tuberculosis.** H. G. Schaffeld, B. Garthwaite and J. B. Amberson. Am. Rev. Tuberc. **69:**520-542 (April) 1954.

The therapeutic effect of viomycin in a series of 23 cases of human tuberculosis is presented. The patients were treated with drug regimens of 50 to 60 mg. per kilogram of body weight given daily or on a twice weekly schedule for periods of 30 to 263 days. Far advanced pulmonary tuberculosis was present in 21 patients, and extrapulmonary tuberculosis was demonstrated in 9 of the 23 patients. Eleven patients were known to have tubercle bacilli resistant to streptomycin, and 8 patients had never received previous antimicrobial therapy. It is evident from both the tabulated results and the representative case reports that viomycin had appreciable antituberculous action in this series of patients. Viomycin has definite but not prohibitive toxicity. Laboratory facilities, chiefly audiometry and plasma electrolyte studies, should be available if viomycin is to be safely administered. Further studies of the emergence of bacterial resistance to viomycin are indicated. Additional studies using intermittent and combined drug regimens seem warranted. Viomycin apparently is less effective against human tuberculosis than streptomycin or isoniazid; therefore, its chief indication appears to be in patients with tubercle bacilli resistant to the latter two drugs who require additional chemotherapy.

**Prevention of Experimental Diabetes with Adrenal Steroids.** B. A. Houssay, R. R. Rodriguez and A. F. Cardeza. Endocrinology **54:**550-552 (May) 1954.

Houssay and associates point out that Foglia demonstrated in 1944 that, after a subtotal pancreatectomy in white rats (removal of approximately 95% of the pancreas), the blood sugar level remains normal for a few weeks and then diabetes develops progressively. Later Foglia and others demonstrated that the administration of estrogens for six months after pancreatectomy has a preventing action on the onset of diabetes. Studies on rats with diabetes caused by Alloxan (2,4,5,6-tetraoxohexahydropyrimidine) revealed that normal glycemia can be restored in such rats by estrogen therapy or by the combined administration of estrogen and insulin. Houssay and associates describe the effects of adrenal steroids (given daily for six months) on the incidence of diabetes in rats that have had partial pancreatectomy and ovariectomy. Desoxycorticosterone acetate in the dose of 100 mcg. per rat per day had no effect. The administration of compounds A, E, and F, in doses of 50 to 150 mcg. per rat per day greatly decreased the number of diabetic rats at the end of six months. With the high doses of compound A (50 mcg. per rat per day) and compound E (150 mcg. per rat per day) the action was diphasic, i. e., an initial increase and a secondary decrease in the incidence of diabetes. With a small dose of compound E, only the preventive phase was observed. The animals in which the protective action of adrenal steroids was observed showed a marked hypertrophy and hyperplasia of the islets of Langerhans of the pancreas.

**Pulmonary Histoplasmosis in a Farm Family: A Three-Year Follow-Up.** C. G. Loosli, J. J. Procknow, F. Tanzi and others. J. Lab. & Clin. Med. **43:**669-695 (May) 1954.

The changing clinical and laboratory findings in six members of a farm family who had pulmonary infection due to Histoplasma capsulatum were observed over a period of three years. The 49-year-old father had a severe prolonged febrile illness of three months' duration. Two sons, aged 21 and 15, had acute, extensive, but less severe pulmonary infections, while two daughters, aged 19 and 17, and a 24-year-old son had lesser pulmonary involvement and no symptoms. All six patients showed noncalcified pulmonary infiltrates on roentgen examination. Diagnosis was made by a combination of procedures including cultures, complement fixation test employing the yeast phase antigen, and skin tests with histoplasmin, coccidioidin, and tuberculin antigens. Sputum and bone marrow cultures from the father yielded H. capsulatum. All six patients reacted positively to skin tests with histoplasmin. None reacted to tuberculin. Serum from five of the six patients showed complement fixing antibodies with the yeast-phase Histoplasma antigen. The highest titers were observed in the serum of the father and the two sons who had febrile illnesses. With recovery, the complement fixation test became negative and the skin tests with histoplasmin were consistently positive. The mother, who had remained well, and the father also acquired positive reactions to tuberculin 16 months after the acute illness of the father. None reacted to coccidioidin. The extensive disseminated infiltrates in the lungs of the father and his two sons underwent healing by fibrosis and calcification. Calcification of the lung lesions occurred most rapidly in the youngest son and most slowly in the father. The hilar infiltrate in the younger daughter healed by resolution, while the lung infiltrates of the older daughter and oldest son showed essentially no change. The source of H. capsulatum on the farm was found to be in a silo that was cleaned by the father and his two sons approximately three weeks before the onset of their illness. The illness of this family is the first in which the source of the Histoplasma fungus that caused the infections was readily found in the immediate environment. It indicates strongly that pulmonary histoplasmosis is an air-borne infection resulting from the inhalation of fungus spores. The study of the silo soil showed that H. capsulatum may persist in the soil for several years. Pulmonary histoplasmosis is the most frequent form of the disease and must be considered in the differential diagnosis of a variety of acute and chronic infections of the lung including acute respiratory disease, viral pneumonia, other mycotic infections, and tuberculosis. Careful history taking concerning the place of residence and the simultaneous use of the tuberculin, histoplasmin, coccidioidin, and blastomycin skin test antigens will aid materially in reaching a correct diagnosis.

**Present Trend in Virulence of Commoner Acute Bacterial Infections.** A. R. Harper. Practitioner **172:**292-299 (March) 1954.

Harper points out that the younger generation of medical practitioners, on reading the descriptions of acute bacterial infections as given in textbooks, must have difficulty in correlating certain of these descriptions with their own experience. They might feel that these descriptions of the dangers of certain acute infections are now out of date and that the fact that they no longer hold the terrors previously ascribed to them is entirely due to the use of the sulfonamides and antibiotics. The author feels that there are other factors involved, notably a change in many of the infective organisms themselves, which is not likely to be permanent. Failure to appreciate this fact can lead to only dangerous complacency. Morbidity and death rates for streptococcic infections in the city of Glasgow over the last 20 years illustrate the gradual decline in their virulence. Scarlet fever today is a mild disease, while 20 years ago it frequently gave rise to fulminating middle ear and mastoid infection or to severe kidney damage. Infection by the hemolytic Streptococcus in puerperal sepsis is of little importance today, whereas infection by coliform bacilli is becoming relatively more serious. The statistics showing the incidence and mortality rate of erysipelas for Glasgow give a picture somewhat similar to those for scarlet fever and puerperal fever. The clinical picture presented by acute septic tonsillitis has also gradually changed, and its severer manifestations are much less frequent. Acute otitis media provides yet a further example; 20 years ago there were many fulminating cases of acute otitis media. Some of these were complications of scarlet fever or measles, while others arose from acute infections of the upper respiratory tract. The course was often rapid, acute mastoiditis supervening and often leading to serious complications such as meningitis or lateral sinus thrombosis. Gradual changes in the nature of infections over the years are not new in medical history, which shows many examples of cyclic variation in virulence and severity. Sooner or later a return to increased virulence may be expected, and, if this occurs, there may be unnecessary deaths while the medical and surgical measures of the past are being relearned by a generation untrained to cope with this type of infection.

**Renal Papillary Necrosis in Diabetes.** R. Moreau, R. Deuil, J. Crosnier and others. Presse méd. **62:**599-600 (April 21) 1954. (In French.)

It has been reported that pyelonephritis occurs in 18 to 22% of diabetics and renal papillary necrosis in 3.4 to 5.2% of diabetics and in about 27% of diabetics with pyelonephritis. Papillary necrosis was found in only 0.07% of nondiabetics, but in 2% of nondiabetics with pyelonephritis. It is a condition likely to appear in diabetic patients after the age of 60. A case of it is reported in a 73-year-old woman with diabetes of 10 years' standing. Despite treatment, she died in azotemia after three months of progressive cachexia. There is no definitive treatment for the condition; urinary obstruction, if it exists, should be alleviated and urinary infection treated. The necropsy findings in the authors' patient confirmed the diagnosis. There are no specific clinical symptoms that permit recognition of the lesion; occasionally, diagnosis of renal papillary necrosis has been made during life because of urinary elimination of necrotic tissue or through verification at operation. The symptoms seen on retrograde pyelography and the pathological anatomy of the lesion are described.

**Porphyria Treated with Neostigmine.** R. O. Gillhespy and S. G. Smith. Lancet **1:**908-910 (May 1) 1954.

The patient described, a 37-year-old woman who had acute porphyria, exhibited unusual clinical features, including paralysis of the left laryngeal nerve, deterioration in clinical condition after electroconvulsive therapy, hirsuties, lymphocytic infiltration of the muscles, and the presence of uroporphyrin 1 and porphybilinogen in the urine. Treatment with neostigmine was tried because the histological appearance of the muscle resembled that of myasthenia gravis. The patient recovered when 1 mg. of neostigmine was given subcutaneously three times a day and later by mouth in 10 mg. doses.

**Vitamin C and A in Carcinoma: Contribution to Hypervitaminization Therapy of Patients with Cancer.** E. Schneider. Deutsche med. Wchnschr. **79:**584-589 (April 9) 1954. (In German.)

A vitamin C deficiency varying from 3,000 to 9,000 mg. with an average deficiency of 4,550 mg. was revealed by serial examinations with the saturation method performed on 10 patients with carcinoma of the stomach, rectum, and uterine cervix and with bronchial carcinoma. In an attempt at improving the general condition of patients with carcinoma before surgical intervention, this vitamin C deficiency was compensated by daily administration of 1,000 to 2,000 mg. of vitamin C. The vitamin C balance still remained labile. Administration of vitamin C increases the mesenchymal defense power but does not exert any anticancerous effect. Two women, aged 79 and 67, with cancer of the uterine cervix and one man with cancer of the rectum were treated by application of vitamin A acetate (Arovit) tampons to the ulcerated tumor. Within three weeks the ulcers healed and the patients' general condition was improved. Carcinomatous ulcers may be favorably influenced by local treatment with vitamin A in oily solution. There is rapid cleansing, epithelization takes place, and infiltration disappears. Local vitamin A therapy was ineffective in a 67-year-old woman with a sarcomatous hemangioendothelioma of the femur and in a 24-year-old man with a sarcomatous ulcer of the left wall of the thorax. In the course of the last three years, combined parenteral administration of 1,000 mg. of vitamin C and 300,000 I. U. of vitamin A daily was practiced in 100 patients with tumors. Illustrative cases in one man with cancer of the ileum, three men with cancer of the stomach, and one woman with bilateral cancer of the ovaries are described. The general condition of the patients was favorably influenced. Definite prolongation of life and prevention of cachexia was observed in incurable patients. There was increase of weight and the erythrocyte sedimentation rate was reduced. Temporary diminution in the size of the tumor was observed, but not complete disappearance. As a result of their experience, the authors consider the clinical effect of vitamin C and A therapy in carcinoma, but not in sarcoma, as equivalent to that of hormone therapy in tumors of primary and secondary sex organs. Vitamin C and A administration may be employed also for the treatment of cancer of these organs. Massive vitamin therapy has the advantage of being free of any risk, since it has no component that may potentially influence tumor development. The maximum amount of vitamin A administered consisted of 281 daily doses of 300,000 I. U.; this was tolerated without any signs of hypervitaminosis such as fatigue, headache, vomiting, and cutaneous scaling.

## SURGERY

**Indications for Segmental Resection in Pulmonary Tuberculosis.** L. A. Brewer III, H. W. Harrison, R. P. Smith and A. F. Bai. Am. Rev. Tuberc. **69:**554-565 (April) 1954.

The present work is based on experience with 121 cases of pulmonary tuberculosis in which segmental resection of tuberculous lesions was performed. Postoperative complications were few in this series, and the operative mortality was 1.8%. Follow-up of these patients had not been very long at the time of writing, but their good early clinical results led the authors to conclude that the indications for operation laid down by them are valid. Segmental resection is performed most successfully when the acute phase of the tuberculosis has subsided, the disease process is stabilized, and the patient is able to mobilize a maximum resistance to the tubercle bacillus. The lesions constituting absolute indications for segmental resection, i. e., not controllable by collapse therapy, are blocked cavities, thick-walled cavities, tension cavities, middle and lower lobe cavities, atelectasis, bronchiectasis, and tuberculomas. Another indication for the procedure is lesions presenting diagnostic problems. Under the heading of "elective indications" the authors place simple cavities (also controlled by collapse), tension cavities (rarely controlled by collapse), and, tentatively, "potentially dangerous" caseous or fibrocaseous lesions. The operation is most useful in early and moderately advanced disease; thus, it assumes greater importance as diagnosis of tuberculosis is made earlier. The authors believe that, if their indications and requirements for segmental resection are strictly adhered to, this form of treatment is ideal because it conserves pulmonary tissue, makes the arrest of the disease permanent, offers minimal thoracic cage deformity, and effects this with minimal expenditure of time for the patient. Although the indications for segmental resection in active and cavitary pulmonary tuberculosis are fairly clear cut at this time, a final opinion cannot be given regarding the treatment of tiny persistent asymptomatic tuberculous lesions in the lung when sputum is negative for Mycobacterium tuberculosis.

**Recurrent Intussusception Due to Intestinal Polypi Associated with Oro-Buccal Pigmentation and Familial Tendency: Study of Two Cases.** H. B. Young. Edinburgh M. J. **61:**122-126 (April) 1954.

Multiple adenomatous polyps of the small intestine accompanied by melanin pigmentation of the lips, oral mucosa, and elsewhere present a rare combination. Young recently observed two cases of this type. The first patient was a girl, aged 16, who had two operations for intussusception, with an interval of two and one-half years. The examination of the removed portion of the intestine revealed a large number of pedunculated polyps hanging from the mucosa and a vast number of tiny projections from the mucosal folds. The second patient was a woman 32 years old at the time of her sixth operation for severe abdominal colic and vomiting. Laparotomy revealed an extensive intussusception of the jejunum caused by a large polyp. This was reduced, a section of bowel was excised, and end-to-end anastomosis performed. The five previous operations had been at the ages of 10, 13, 18 and two at the age of 20. At the first four operations, intussusceptions had been reduced, in one instance combined with resection and anastomosis and in another with excision of polyps. At the fifth operation an elective resection of the jejunum was performed and a side-to-side duodenojejunostomy was carried out. In both of these patients there was oral and buccal pigmentation and there were freckles on face, forearms, and fingers. The author feels that it is best to wait until intussusception occurs and then resect the whole area involved if it is within a reasonable length of bowel.

The administration of iron preparations in the treatment of any subsequent anemia should be done with care, as some may cause temporary intussusception. The familial occurrence and the tendency of the adenomatous polyps to undergo malignant degeneration are much less pronounced in these lesions of the small intestine than in the strongly familial and carcinogenic adenomatosis of the colon.

**Interdigital Sinuses of Barbers' Hands.** A. R. Currie, T. Gibson and A. L. Goodall. Brit. J. Surg. **41**:278-286 (Nov.) 1954.

When a barber came to the surgical outpatient department of their hospital with an interdigital sinus of the hand, Currie and associates were unable to find a similar case in their records, but were surprised to find four others as a result of casual inquiry at their barber shop. When subsequently they examined the hands of 77 men's hairdressers from 18 shops, they found 10 who showed the lesion in some stage of development. Inspection of the hands of 61 ladies' hairdressers revealed not a single lesion of this type. The authors emphasize that this lesion is produced by the short, sharp, clipped hairs of men, not by the usually longer softer hairs of women. Observations on 11 cases of interdigital sinuses of the hands are reported, bringing the total number of such cases reported in the literature to 29. This number bears no relation to the incidence of the lesion, which is common among barbers. The pathology and mode of development of these sinuses are described. In the early shallow pitted stage of the lesion, excision has not been advised. Once it has advanced beyond this stage, however, surgical excision is the treatment of choice, particularly if repeated infective episodes have occurred. Six of the eight patients accepted operation. Two with multiple sinuses required a free skin graft after excision, the remainder being closed by direct suture. Primary healing occurred in each case and the results were satisfactory. The authors feel that if barbers paid sufficient attention to hand hygiene and were careful to remove all the hairs from their finger webs at the end of each day's work this lesion could be prevented. Many of the previous reports on interdigital sinuses of barbers' hands have referred to them as "pilonidal sinuses." This term is often used incorrectly to describe lesions differing in etiology and pathology, such as pilonidal suppuration in the axilla, the postanal region, the perineum, the sole of the foot, and the umbilicus. The authors feel that the term pilonidal should be retained only for the cases of postanal sinus that are not of a congenital nature and that contain hairs and, perhaps for the perineal lesions. The lesions described here should be known as "interdigital sinuses of barbers' hands."

**Four Sympathectomies in Treatment of Malignant Obliterating Endangiitis.** R. Wanke. Chirurg. **25**:150-152 (April) 1954. (In German.)

According to Wanke, the ordinary type of endangiitis usually involves the lower extremities and occasionally shows spontaneous remissions. The malignant type, which occurs mostly in younger persons, differs from the commoner type chiefly by its early generalization. The disease is systemic, as demonstrated in electrocardiographic and eyeground changes. Wanke presents observations on eight patients with the malignant form in all of whom all four extremities became involved within a relatively short number of years. Onset of involvement of the hands and fingers was as frequent as that of the feet and toes. Four of the patients, who were observed before 1941 (ranging in ages from 17 to 35), had ulcerations and necrosis of the fingers and toes when treatment was begun, and for this reason more or less extensive amputations or exarticulations became necessary. The simultaneous resection of the truncus sympathicus could not prevent the progression of the malignant degeneration. These four patients lost parts of all four extremities. At the end of 10 years only one patient is alive, and he has lost both lower extremities and several fingers on both hands. The therapeutic effect of sympathectomy is most satisfactory when carried out before necrosis or ulcerations have developed. This the author was able to observe on a large number of cases. When the results of sympathetic resection were estimated on the basis of improved circulation, it was found that 67 of 76 operations carried out before peripheral necrosis had set in were successful, whereas sympathectomy in 52 patients with necrosis was successful in only 22. The last four of the aforementioned eight patients were treated between 1948 and 1952. Circulatory disturbances existed in all four extremities and the diagnosis was based on the measurement of the skin temperature, oscillography, and angiography. All were subjected to four sympathectomies, a bilateral lumbar sympathectomy, and a bilateral thoracic sympathectomy. In the thoracic resections only the third ganglion was removed as a rule, whereas the lumbar chain of ganglions was more completely removed. Only one of these four patients subsequently required an amputation. But even this patient is able to work. The other three have all four extremities. At the last follow-up (one to four years after sympathectomy) the favorable results were still evident. The qualitative improvement of the circulations is best determined by measuring the skin temperature before and after sympathectomy.

## NEUROLOGY & PSYCHIATRY

**Cerebral Atrophy: Clinical Manifestations in Adults.** E. D. Fisher. California Med. **80**:303-305 (April) 1954.

Whereas a great deal of attention has been given to senile and presenile cerebral atrophy and to the shrinking of the brain incident to deleterious influences at birth or in early life, the atrophic conditions of the brain occurring in the robust years of adulthood appear to have been largely ignored. Impressed with the relative frequency with which atrophy is encountered in persons between 25 and 50 years of age, Fisher reviewed the clinical records of 200 patients with a diagnosis of cerebral atrophy. He found that in patients under 70 years of age cerebral atrophy was twice as common in men as women. In patients over 70 the ratio was reversed. The incidence of cerebral atrophy was relatively high in the age group 35 to 50. Convulsions were present in more than a third of the 200 patients. Neurological abnormalities were present in 51% of the entire series. Significant personality deviations were observed in 31%. Although the electroencephalogram was abnormal in many patients, it appeared to be of little aid in the diagnosis of the cerebral atrophy. Most of the patients in the 35 to 50 year age group did not have the symptoms characteristic of Alzheimer's disease, and in only a few cases did the symptoms resemble those of other recognized disease entities. The author suggests that in a few cases vascular diseases may have played a causative role. Furthermore, the Alzheimer's disease in persons who are not confined may have different clinical manifestations from those of the Alzheimer's disease that has been studied in institutions.

**Sarcoidosis with Involvement of the Nervous System: Report of Nine Cases.** O. Höök. A. M. A. Arch. Neurol & Psychiat. **71**:554-575 (May) 1954.

Involvement of the nervous system in patients with sarcoidosis is comparatively rare, occurring in only from 1 to 5% of all cases. Neurological complications may appear in any part of the nervous system and may be manifested clinically by generalized or focal disturbances of cerebral function. Diagnosis of the disease, which is usually based on the character of the skin lesions and the lymph node enlargement, with or without the support of biopsy, may be difficult when neurological symptoms are present. Diseases with which sarcoidosis may be confused and which, like it, sometimes produce symptoms of nervous system involvement include tuberculosis, syphilis, polyarteritis nodosa, disseminated lupus erythematosus, infectious mononucleosis, histoplasmosis, toxoplasmosis, brucellosis (undulant fever), Behcet's syndrome, and Hodgkin's disease. Sarcoidosis should be suspected whenever two or more of the following conditions appear concurrently: (1) skin lesions; (2) mucous membrane lesions; (3) enlarged lymph nodes; (4) pulmonary lesions; (5) skeletal changes; (6) swelling of the salivary glands, especially the parotid; (7) ocular lesions; (8) enlargement of the liver and spleen; (9) neurological symptoms and cerebrospinal fluid changes; (10) hyperproteinemia (the albumin-globulin ratio is often reversed); and (11) a negative tuber-

culin reaction (found in from 60 to 70% of cases). Facial paresis, often recurrent, is the commonest sign of nervous system involvement. The course of the disease is prolonged, with alternate periods of progression and spontaneous regression. Prognosis, though usually good, is comparatively poor in patients in whom the nervous system is involved. Neurological symptoms constituted the initial complaint in seven of the author's nine patients, two of whom presented a picture of cerebral tumor. Fairly rapid clinical regression of the symptoms occurred in one of these, but in the other surgical intervention was needed to remove a granulomatous, tumor-like mass that caused an obstruction in the inferior horn of the right lateral ventricle and produced profound mental symptoms, as well as signs of increased intracranial pressure. Follow-up of the patients in this series for an average period of five years showed either complete disappearance or marked regression of their neurological symptoms. Specific therapy is not available but preliminary reports on the use of corticotropin (ACTH) and cortisone suggest that they may prove beneficial to patients with sarcoidosis.

## PEDIATRICS

**Effect of Antimicrobial Therapy on the Prognosis of Primary Tuberculosis in Children.** E. M. Lincoln. Am. Rev. Tuberc. 69:682-689 (May) 1954.

Of 980 children with primary pulmonary tuberculosis who were admitted to the tuberculosis ward of Bellevue Hospital, New York, between 1930 and 1946 and did not receive specific therapy, 211 (21.5%) died. Of 421 children with primary pulmonary tuberculosis who were admitted to the same hospital between 1947 and 1951, only 147 (35%) were given specific treatment with streptomycin, *p*-aminosalicylic acid, and thiazolsulfone (Promizole), and only 21 (5%) of the 421 children died. In 1952, isoniazid was added to the therapeutic regimen, and of the 129 patients treated 2 died; the mortality rate thus was further reduced to 1.5%. There is evidence in these 129 patients, as well as information from other workers, that isoniazid may prevent the development of complications of primary pulmonary tuberculosis, especially meningitis. To investigate this important point, a comparative study of a carefully controlled series of children with primary tuberculosis in which the patients to be given antimicrobial therapy are selected at random and all the children are followed for at least one year is in progress at the Bellevue Hospital. Since the actual incidence of meningitis in primary tuberculosis is unknown, a very large number of cases may be required to demonstrate the effectiveness of isoniazid in the prevention of meningitis. A cooperative study by a larger group of investigators using similar methods of selecting patients for antimicrobial therapy and a similar plan of treatment might be most helpful for this purpose.

**Hemolysis in Infants Following Administration of Pooled Plasma.** H. G. Keitel and J. Wich. A. M. A. Am. J. Dis. Child. 87:537-542 (May) 1954.

Plasma was given to 21 of several hundred infants with gastroenteritis, who were in transit to or from Europe as dependents of military personnel. None of the 21 had received blood or plasma prior to their admission to the Station Hospital, but hemolysis developed in 5 of the 21 who had gastroenteritis, possibly of viral cause. Plasma was given to acutely dehydrated patients as a lifesaving measure and as a general supportive agent to infants with prolonged diarrhea and hypoproteinemia. It was administered at room temperature at a rate not exceeding 200 ml. per hour. The total amount given per 12 hour period did not exceed 10 ml. per kilogram of body weight. No reactions were observed during the infusion. The plasma used was American Red Cross pooled plasma. The number of donors per lot was in excess of 10. Different lots of plasma were used for each administration. The authors regard it as noteworthy that all five infants in whom hemolysis developed belonged to blood groups $A_1$ or $A_1B$, $Rh_o+$. The blood groups of 10 other infants with gastroenteritis who were given plasma but who had no signs of hemolysis were determined. Five were of group O and received from 100 to 580 ml. of plasma; the sixth was of group B and received a total of 1,085 ml. of plasma. The remaining four patients were of group A and received from 250 to 645 ml. of pooled plasma. Two of these 4 received less plasma than any of the five patients with hemolysis, and one was given a whole blood transfusion shortly after plasma therapy, which would have obscured any drop in hemoglobin. The possible role of isoantibodies in causing hemolysis in group A or AB patients is discussed. All five patients with hemolysis were given whole blood transfusions without reaction and recovered completely. An eight month follow-up failed to reveal jaundice in any of the patients given plasma.

**Urinary Excretion of Lead in Children: Diagnostic Application.** R. K. Byers, C. A. Maloof and M. Cushman. A. M. A. Am. J. Dis. Child. 87:548-558 (May) 1954.

Various analytic methods based on the striking color produced by the reaction between lead and diphenylthiocarbazone (Dithizone) were explored by Byers and associates. Methods based both on titration and on direct colorimetry were studied, but though they gave quantitative data in aqueous solutions of mixtures of salts, with urine the results were too uncertain for accurate work. After considerable investigation the authors found that by employing a modification of Fairhall's micromethod, which uses diphenylthiocarbazone for the preliminary separation of lead but that extracts the lead from the diphenylthiocarbazone and analyses it as the dichromate, accurate estimation of the 24 hour urinary lead excretion was possible in properly collected samples. Urinary excretion of lead was studied in 68 children between the ages of 6 months and 14 years. Most of the children studied were controls, who had no history of exposure to lead, but diagnoses of lead poisoning were made in 23, and, aside from any help obtained by measurement of urinary lead excretion, the diagnoses were based on the presence of at least three of the major clinical signs of lead poisoning in children, namely (1) secondary anemia with stippling, (2) evidence of involvement of the central or peripheral nervous system or both, as exemplified by clinical symptoms and signs and/or spinal fluid changes, (3) x-ray evidence of condensation of the lines of provisonal calcification of the shafts of the long bones, (4) glycosuria with normal blood sugar, (5) abdominal complaints, i. e., vomiting, cramps, and constipation, and (6) chemical identification of the source of lead. The excretion of more than 80 mcg. of lead per 24 hours always indicated lead poisoning in the age group examined. Values between 55 and 80 mcg. per 24 hours always indicated more than the usual contact with lead and the possibility of poisoning. Values below 55 mcg. per 24 hours occurred in desperately ill patients with lead poisoning, when renal blood flow was believed to be inadequate and for no apparent reason in one child with lead poisoning. All control patients gave values below 55 mcg. per 24 hours. After a year or more of protection from lead ingestion, the urinary excretion of lead in patients with known intoxication fell into the normal range. The finding of a normal urinary 24 hour lead excretion appears to be fairly reliable in excluding recent lead poisoning in persons with adequate renal blood flow. The authors illustrate on the basis of a case history the mistake of diagnosing lead poisoning on the basis of a history of pica for paint and characteristic x-ray evidence in the bones. Urinary excretion of lead was 21 and 14 mcg. per 24 hours on two successive days, and samples of paint from the chewed window sills showed no lead.

**Treatment of Nocturnal Enuresis with Banthine (Methantheline): Preliminary Report.** J. Palma Eckart. Rev. chilena de pediat. 25:26-27 (Jan.) 1954. (In Spanish.)

Essential enuresis may be observed in children and in adolescents. When the condition is not controlled early in life, the patients frequently develop an inferiority complex. The condition seems to be due to dysfunction of the bladder originating in vagosympathetic dystonia. As a rule sympathomimetic drugs, such as atropine and those of a similar effect, and depressors of the nervous system, such as magnesium sulfate and drugs of similar effect fail. The author administered methantheline

(Banthine) to six patients between the ages of 4 and 6 years. The drug was given in three series of 15 days each, by the following scheme. A total dose of 75 mg. of methantheline, divided in two doses, was given to the patients by mouth for 15 consecutive days for the first series; every other day for two weeks for the second series; and at intervals of four days, also for two weeks for the third and last series. One or two suppositories of methantheline, 25 mg. each, were given to the patient on retiring the night of the days on which he had been given the drug. Enuresis was controlled in all cases on the second or third day of the treatment. The drug was well tolerated in all patients but one; this patient complained of marked visual disorders that disappeared when the intervals of rest between administration of the drug were increased. The patients were observed for three months after discontinuation of the treatment. There was no recurrence. This is a preliminary report.

## DERMATOLOGY

**Serologic Reactions in Pemphigus Vulgaris: An Attempt to Detect Auto-Antibodies or Virus in Blood Serum or Blister Fluid in Pemphigus Vulgaris.** D. Kopel. J. Invest. Dermat. **22:**261-262 (April) 1954.

Kopel attempted to detect the possible presence of complete or incomplete antibodies or a virus in the blood serum or in blister fluid taken from three patients with histologically confirmed pemphigus vulgaris, two of whom were of blood group O and one of A. The patients' own red blood cells, homologous red blood cells from normal donors, and fowl red blood cells were used. The following methods were employed: (1) the saline hemagglutination test, (2) the albumin test of Diamond and Denton, (3) the indirect antihuman globulin Coombs test, (4) the trypsin test of Morton and Pickles, (5) the trypsinized cell indirect antihuman globulin test of Unger, and (6) the complement-fixation test performed with blister fluid as antigen and blood serum as a source of reagins. No antibodies were detected.

**Lupus Vulgaris Following BCG Vaccination.** P. V. Marcussen. Brit. J. Dermat. **66:**121-128 (April) 1954.

In 1942 Jensen pointed out that there is a biological probability that certain BCG strains may produce lupus vulgaris in the skin, since the virulence of BCG is only slightly lower than that of tubercle bacilli isolated from lupus tissue. The literature up to 1952 contains only three reports of the development of lupus vulgaris at the site of BCG inoculation. Marcussen reports three new cases of lupus vulgaris of which two were certainly caused by BCG vaccine. Thus a total of six cases have now been reported, of which three were certainly and three very probably due to BCG. The author feels that the few cases of lupus vulgaris developing after BCG vaccination are of no great importance for an evaluation of the vaccination as such. They prove, however, that BCG may give rise to very protracted infection in man. The author advises that patients in whom granulation tissue develops after BCG vaccination should be observed for at least five years, even though the granulation tissue resolves. Treatment should be the same as for ordinary lupus vulgaris; it should be started as early as possible owing to the poor cosmetic results often obtained in the deltoid region.

**Low Blood Vitamin A Levels in Dermatology.** K. D. Lahiri and F. J. Scandrett. Indian M. Gaz. **89:**31-32 (Jan.) 1954.

One of the most important functions of vitamin A is its influence in maintaining the structural integrity of epithelial cells. Changes in the skin are among the earliest signs of vitamin A deficiency. Lahiri and Scandrett studied the serum vitamin A concentration in cases of ichthyosis, nummular eczema, Besnier's prurigo, neurodermatitis, and alopecia areata. They detected a definite lowering of vitamin A levels in the serum of patients with ichthyosis and nummular eczema, whereas in cases of Besnier's prurigo, neurodermatitis, and alopecia areata the serum vitamin A concentration was within the normal range. Encouraging results have been obtained with vitamin A therapy in ichthyosis and in nummular eczema by one of these authors. Other dermatological conditions in which vitamin A therapy has been found effective by these and other investigators include leukoplakia, kraurosis vulvae, pruritus vulvae, brittleness of the nails, chronic hyperkeratotic lichen simplex, benign chronic pemphigus, alopecia, canities, and macular pigmented lesions observed in patients subsisting on diets low in animal proteins.

## THERAPEUTICS

**Six Years of Experience with Aerosol Therapy in Children.** C. Imperato. Gior. clin. med. **35:**189-210 (Feb.) 1954. (In Italian.)

The author reviews the results of six years of aerosol therapy at the children's clinic of the University of Parma. Good results were obtained in seven children with lung abscess secondary to pneumonia who were given penicillin aerosol combined or not with intramuscular administration of the same antibiotic and pyrimidine derivatives. Favorable results were also obtained in seven children with bronchiectasis to whom antibiotic aerosols were given for at least two weeks. Aerosol therapy was also used at the clinic for 97 children within the second year of life with bronchopneumonia, although as a rule it is not indicated in this condition. Aerosols containing bronchodilating drugs, such as procaine, isopropylarterenol (Aleudrine), and others, were used alone in urgent cases, while in others the drugs were combined with penicillin and streptomycin also in aerosols on an average of four times daily. The results were gratifying. Dyspnea and breathing improved, and the clinical picture was favorably influenced. Aerosol therapy was also given to 220 children with acute bronchitis after the acute phase of the disease. The results were difficult to evaluate. They were good in 75 children with acute laryngitis and laryngotracheitis when procaine aerosol alone or combined with other substances with a vasoconstricting and sympathomimetic action was followed by penicillin aerosol and continued for several days. Aerosol therapy proved especially good for 140 children with whooping cough who were given streptomycin in doses of from 75 to 100 mg. three to six times daily according to the clinical picture and the age of the patient. Vomiting and number and intensity of attacks diminished when this therapy was instituted early. Bronchodilating drugs in aerosols gave good results in 52 children with asthma or asthmatic bronchitis; the asthmatic attacks subsided quickly and the side-effects were rare. Penicillin aerosol was used for children with rhinopharyngitis, sinusitis, otitis media, and diseases of the tonsils, but the results were inconclusive. Aerosol therapy with G-strophanthin (Ouabain) used for children with cardiovascular impairment did not give encouraging results. Attempts were also made to treat rheumatic carditis with sodium salicylate aerosol and to perform bronchoscopy with procaine and opaque medium aerosols. Results were not good. The efficacy of aerosol therapy for conditions of the respiratory apparatus as well as for whooping cough and asthma has been established during these six years at the University of Parma. It is hoped that this form of therapy will also become effective in cardiac therapy.

**Thrombocytopenic Purpura After Administration of Gold: Comparison of Treatment with Dimercaprol, ACTH, and Cortisone.** M. Thompson, R. J. G. Sinclair and J. J. R. Duthie. Brit. M. J. **1:**899-902 (April 17) 1954.

Two patients with thrombocytopenic purpura that followed courses of gold therapy for rheumatoid arthritis are described. In the first case, dimercaprol given in the recommended doses (total 1.2 gm.) appeared to have little immediate effect on the course of the condition. Unusual neurological signs occurred in this patient, probably caused by small hemorrhages into the cord and brain stem. In the second case, large doses of corticotropin (ACTH) and cortisone had no significant effect on the platelet count or the anemia, though the bleeding time did show some improvement and the capillary resistance rose sharply from an initially subnormal level. The response to dimercaprol (450 mg. daily), however, was prompt and unequivocal. The authors conclude that higher daily doses and more prolonged periods of administration of dimercaprol are needed.

**Varex (Mono-Ethanol-Amine-Oleate) Allergy.** J. Voight. Ugeskr. laeger **116**:452-457 (March 25) 1954. (In Danish.)

Injection treatment of varices with monoethanolamineoleate (Varex and like preparations) involves the risk of allergic reactions that may be fatal, a risk easily overlooked because of the infrequency of these reactions. A case of fatal anaphylactic shock caused by hypersensitivity to this drug is reported, and 4 other cases of lethal reaction to the substance and 15 cases of nonfatal reactions are cited. The reactions are capricious, and the symptomatology is varied. In allergic persons and in persons previously given injections with this substance or morrhuates, an intracutaneous test with 0.1 ml. of a 1% solution of monoethanolamineoleate is advised. On the first injection, a small test dose, 0.25 ml., is proposed, so that the universal as well as local reaction can be studied. On succeeding injections, the dose should hardly exceed 3 ml. At the slightest sign of generalized side-effects, another substance, such as glucose, should be substituted in carrying out the treatment. The procedure outlined guards as far as possible against injections in persons already hypersensitive and allows timely recognition of weak signs of beginning hypersensitivity. It is suggested that asthma is a contraindication for the treatment.

**Post-Transfusion Reactions and *p*-Aminobenzoic Acid.** G. Mars and W. Molla. Minerva med. **45**:694-697 (March 10) 1954. (In Italian.)

From January to May, 1952, the authors made a study to determine the effects of *p*-aminobenzoic acid on post-transfusion reactions that, despite the latest advancements, still retard the therapeutic effects of this procedure and sometimes cause severe damage. The study was carried out at the Ospedale Maggiore in Milan on 800 blood transfusions. The procedures adopted and the apparatus used were not changed during the entire period of the study, and the personnel was always the same. Transfusions performed during surgery were not included in the study, which covered only medical patients. Immediately before the transfusion, *p*-aminobenzoic acid in the form of sodium salt was added to 250 of the 800 bottles of blood in the dose of 1 gm. per 100 cc. of blood. The patients who received blood from the other 550 bottles served as controls. There were post-transfusion reactions in 48 of the controls as compared to 11 of those who received the blood containing *p*-aminobenzoic acid. In the 11 patients, the reactions were milder, and shivering and fever were always well tolerated. There were no immediate or late toxic effects attributable to the drug. It is difficult to explain the mode of action of *p*-aminobenzoic acid, especially in view of the many factors that may be responsible for post-transfusion reactions. The authors feel that, in addition to improving the techniques and apparatus available, *p*-aminobenzoic acid should be added systematically to blood to be used for transfusion. It decreases the number and attenuates the intensity of the reactions that may be caused either by factors inherent to the blood of the donor or the recipient or by pyrogenic substances.

**Clinical and Metabolic Action of Electrocortine (Aldosterone).** R. S. Mach, J. Fabre, A. Duckert and others. Schweiz. med. Wchnschr. **84**:407-416 (April 10) 1954. (In French.)

Electrocortine (Aldosterone), a new adrenocortical hormone, was given a therapeutic trial in two men with Addison's disease. The older patient was given 4 mg. of desoxycorticosterone acetate in oily solution for one day and 6 mg. of the same drug for the two subsequent days. For the next two days no drug was given, while for the following six days electrocortine was administered in a solution of 100 mcg. per 1 cc. of pure sesame oil; 300 mcg. per day in two injections was given the first two days; 200 mcg. per day in three injections for the next two days; and 150 mcg. per day in three injections for the last two days. After a drug-free interval of two days, 6 mg. of desoxycorticosterone acetate was given daily for two days; and the next day an implantation of 700 mg. of Percorten (a proprietary preparation of desoxycorticosterone acetate) was done. The younger patient had been maintained in good health with repeated implantation of Percorten. Because of the reappearance of symptoms of adrenal insufficiency of several weeks' duration, he was given 150 mcg. of electrocortine daily in three injections for two days and 200 mcg. of electrocortine daily in three injections for the next three days. The new hormone was given to both patients after a period of adrenal insufficiency, and in both the clinical symptoms disappeared within several hours after the institution of the treatment. Within a few days the pigmentation of the skin diminished and the orthostatic blood pressure was restored to normal without an abnormal increase in the arterial blood pressure. Similar to desoxycorticosterone acetate, electrocortine caused retention of sodium and of chloride and increased excretion of potassium; parallel with that, typical signs of dilution of the blood were observed and there was also a slight decrease of the potassium level. The effect of electrocortine on carbohydrate metabolism was demonstrated by the normalization of the blood sugar curves in the glucose tolerance test; the hyperglycemic peak was increased and the hypoglycemic reaction suppressed. The pain in the knee joint of which the older patient complained subsided in the course of the treatment with electrocortine. At the low dosage used in the substitution therapy, electrocortine did not exert any effect on the morphological elements of the blood, on nitrogen metabolism, on the water test, or on the 17-ketosteroid and (formaldehydogenic) corticoid levels in the urine. The effective dose of electrocortine was between 150 and 200 mcg. (2.5 to 3.3 mcg. per kilogram of body weight) per day; electrocortine thus was 20 to 30 times more potent than desoxycorticosterone acetate. In contrast to desoxycorticosterone acetate, electrocortine does not seem to cause elevated blood pressure or abnormal water retention.

**Biological Actions and Therapeutic Applications of Nitrogen Mustard.** J. W. Beattie and L. H. Howells. Quart. J. Med. **23**:231-254 (April) 1954.

Beattie and Howells review their experience with the nitrogen mustards in 51 patients, including 27 with Hodgkin's disease. Only 6 of these 27 are living, but in 15 of the 21 who died clinical assessment indicated a favorable response to initial treatment. The six still living responded favorably for a considerable period. Of eight patients with lymphosarcoma four were in a fair and four in a poor condition when treatment with nitrogen mustard was started. The number of courses of treatment was one in five patients, two in two patients, and six in one patient. Of the six patients who died, three showed temporary improvement and survived for 4 months, 34 months, and 49 months, respectively. Of the two who are still living, one has survived one year and the other two years, each having shown a good response after one course of treatment. The number of courses of treatment administered to eight patients with myeloid leukemia was one in five patients, three in two patients, and seven in one patient. Six of these patients died within 12 months of treatment, some of them having shown temporary improvement. One patient is still alive after 29 months, and in this case success can be claimed. Another patient is alive after five months and has shown a good initial response. The treatment with nitrogen mustard proved ineffective in one patient with polycythemia vera, in two with acute leukemia, in three with chronic lymphatic leukemia, and in two with carcinoma of the lung. Although the result based on the survival rates in Hodgkin's disease might suggest that this therapy is disappointing, such results do not give a true picture of its value, because a number of patients responded favorably at first, with improvement in general health, and diminution in the size of lymph nodes and spleen. The relief of distressing mediastinal lymphadenopathy was sometimes striking. Most other investigators also noticed the great improvement in the patients' general condition—the relief of night sweats and other toxic symptoms, the rapid drop in fever, the return of appetite, the gain in weight, and the shrinkage of granulomatous masses and infiltrations. In lymphosarcoma, the results obtained with nitrogen mustard were qualitatively similar to those described in Hodgkin's disease, but the treatment was much more frequently unsuccessful. All authors agree that the acute leukemias are not responsive to nitrogen mustard, though there may be temporary remissions lasting a few weeks.

# BOOK REVIEWS

**The Child, His Parents and the Physician.** By Hale F. Shirley, M.D., Professor of Pediatrics and Psychiatry, Stanford University School of Medicine, San Francisco. Publication number 205, American Lecture Series, monograph in Bannerstone Division of American Lectures in Pediatrics, edited by John A. Anderson, M.D., Professor and Head, Department of Pediatrics, Stanford University School of Medicine. Cloth. $3.75. Pp. 159, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W. Toronto 2B, 1954.

In their practice, most physicians encounter children and their parents. Unless they have had a wide experience or have specialized in pediatrics or pediatric psychiatry, they may not be aware of the influence of the parent-child relationship on the physical and emotional health of both the child and his parents. Dr. Shirley has outlined in an elementary and slyly humorous way the viewpoint concerning the child and the child's emotional needs; he has also presented a time table of the emotional development of the child. This particularly relates the child to his parents at various stages in his development. This book goes further than most in discussing emotional development by pointing out the various forces involved in socialization of the emotions that will permit family living in a social order. The adaptive techniques used to overcome anger, hostility, fear, and anxiety are discussed in detail. After this outline of emotional development, two chapters deal with the doctor-patient relationship and counseling the parents. These alone make the book worth while; they point out the inadequacy of present history-taking techniques in finding out how parents feel about their children and about those who may come into contact with their children. Dr. Shirley's book is a readable discussion of an important aspect of the development of emotionally sound children. Since the physician plays such an important role in the emotional development of children, particularly as regards their relation with their parents, this book should be of value to any physician who treats children.

**The Psychiatrist and the Law.** By Winfred Overholser, M.D., Sc.D., Professor of Psychiatry, George Washington University School of Medicine, Washington, D. C. The Isaac Ray award book. Cloth. $3.50. Pp. 147. Harcourt, Brace and Company, Inc., 383 Madison Ave., New York 17, 1953.

These four lectures were delivered at Harvard in 1952. They were addressed to members of various professions and so are not overburdened with detail. The first lecture deals with psychoanalysis; the second protests the insensibility of courts to modern psychiatry; the third describes how patients are committed; and the fourth discusses expert testimony. The author stresses these opinions: criminal law ought to be revised to take account of disordered minds, civil law should allow for more psychiatric advice, and the courts must guard the dignity of expert witnesses.

Our criminal law uses the rules in the case of M'Naghton that were announced under Victorian pressure but not meant as precedent. By them many deranged persons have been unjustly condemned. These rules, however, are not the only problem. In the world of Freud we all move with brutish intent, and the actual criminal is distinguished not by his evil will but by his diseased control. Therefore, Dr. Overholser believes, the courts should diagnose rather than judge, treat rather than punish, and detain for psychic improvement rather than sentence for a fixed term. Legal and medical circles have sought such reforms for many years. Dr. Overholser also wants to entrench in the civil courts his profession, with its art of weighting a man's meaning by his own most disguised motives. Surrendering to that art more power than the force of its arguments is contrary to the spirit of the law. Even if by that art psychiatrists can avert unfair punishment, it does not follow that they are capable of justly measuring equity.

The third major point of this book is most disturbing. Our law insures that a physician can submit his notions to everyone concerned in a litigation. Our adversary system allows those notions to be dissected with the greatest care; yet Dr. Overholser suggests that tilting in court is a test too rigorous for some medical opinions and fears their disparity can only puzzle judge and jury. He would, therefore, do away with opposing experts and have instead, as *amicus curiae*, a panel of qualified men agreed on by the court, the prosecution, and the defense. The opinion of the panel would be a single line of testimony despite the fact that any panel member could be called as witness for either side. This electoral system of medical opinion would be unfair within the profession and misleading to the rest of the world, for there are still too many internal differences among psychiatric schools to let a majority speak with uncontested authority. If experts have played the fool in court, the obvious remedy is that they learn to handle themselves there. If instead psychiatrists attempt to become oracles to the court, they lay themselves open to the suspicion that they value dignity more than the truth of their ideas.

**Professional Preparation in Health, Physical Education, and Recreation.** By Raymond Albert Snyder, Ed.D., Associate Professor of Physical Education, University of California, Los Angeles, and Harry Alexander Scott, Ph.D., Professor of Health and Physical Education, Teachers College, Columbia University, New York City. Cloth. $5.50. Pp. 421. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36; 95 Farringdon St., London, E. C. 4, 1954.

This comprehensive volume provides a detailed description of the philosophy, principles, and practices underlying professional preparation in health education, physical education, and recreation. Its coverage is confined to the preparation of teachers and leaders for service in these areas by teachers' colleges and departments or schools of education in colleges and universities. After a brief discussion of the foundations and historical developments in each of the three areas, suggestions for implementing a practical program of professional preparation in health education, physical education, and recreation are advanced. The place of general education, general professional education, and specialization in the total program of the undergraduate and graduate student is carefully defined. The specific competencies needed by professional workers in the field are set forth in terms of their teaching and leadership responsibilities. Methods and procedures for developing such competencies are described, as well as standards for administering and evaluating the program of professional preparation. Attention is also given to the development of a worth-while personnel program, including recruitment, selection, counseling, and placement. The book brings together in one volume much material that has previously been available only in incomplete and fragmentary form and suggests practical ways of implementing the recommendations made in the recent national conferences on undergraduate and graduate preparation in health education, physical education, and recreation. It should be helpful to all persons concerned with the preparation of teachers and leaders in these fields as well as those involved in the in-service education of such personnel.

**Cold Injury: Transactions of the Second Conference, November 20 and 21, 1952, New York, N. Y.** Edited by M. Irené Ferrer, Assistant Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York. Cloth. $4. Pp. 242, with 43 illustrations. Josiah Macy, Jr., Foundation, 16 W. 46th St., New York 36, 1954.

This volume is a report of a conference held under the auspices of the Josiah Macy, Jr., Foundation. The purpose of the conferences sponsored by this foundation is to bring scientific workers in various fields together so that they may present their observations and views on a subject. The attendance is limited to 25. The epidemiology of cold injury, resistance to cold, and pathophysiology of cold injuries are considered. It appears from the discussions that frostbite still remains an injury without a readily available form of therapy.

These book reviews have been prepared by competent authorities but do not represent the opinions of any official bodies unless specifically so stated.

# QUERIES AND MINOR NOTES

## ACIDOSIS

TO THE EDITOR:—*I seem to recall that an increase in cases of acidosis occurs in the spring. Is the calcium-phosphorus metabolism implicated? A 2-year-old girl had repeated, not severe, attacks of convulsion. Her breath was sweet. Urinalysis showed acetone bodies, the specific gravity being 1.026. Physical examination showed no disease except moderate anemia. From the history it is possible that moderate acidosis was present for some time before the convulsions occurred. The child did well on parenteral administration of Ringer's solution.*

*M.D., New York.*

This inquiry was referred to two consultants, whose respective replies follow.—ED.

ANSWER.—Increased exposure to sunlight in the spring may activate a provitamin D in the skin, converting it to vitamin D, and in some cases increasing calcium deposition in bones and lowering the serum calcium enough to cause tetany. Severe acidosis usually is not present unless there is some associated renal tubular disease or other metabolic problem.

ANSWER.—Acidosis was formerly frequently listed as a cause of death in children as it occurs in practically all moribund states. Any seasonal incidence might be due to its frequent existence in diarrhea. Here it is the result of excessive losses of mineral cations and bicarbonate, in which dehydration and acidosis are closely interdependent, each aggravating the other. Clinically the most frequent type of acidosis encountered is metabolic, occurring in diabetes, nephritis, and starvation or a failure of the kidney to excrete anions as rapidly as they accumulate in the blood.

Calcium metabolism is effected more by alkalosis, which predisposes to tetany, while acidosis, if it develops suddenly, or the administration of acid-producing salts may cure preexisting tetany. Postacidotic tetany may occur in infants receiving large amounts of fluid therapy for diarrhea. This is due to the fact that in persistent acidosis the total calcium adjusts itself to the increased ionized calcium by renal excretion of calcium and a reduction of total calcium. Sudden reduction of the pH to normal then produces tetany. Another reason is that with increased water loss the concentration of calcium is increased. If hypertonic dehydration persists, the blood level of calcium tends to react towards normal by renal excretion of calcium. The sudden replacement of water deficit causes dilution of extracellular blood, then producing subnormal calcium values. Phosphorus metabolism is influenced only to an indirect extent. This is because acidosis leads to an increased excretion of the mineral cations sodium and potassium. Such losses of mineral cations from the body are additional factors in the development of dehydration, and, when the mineral cations are excreted as buffer salts, such as phosphates, they are an added cause of acidosis.

Ketonuria or acetonuria signifies an accumulation of $\beta$-hydroxybutyric acid and acetoacetic acid in the body, and merely denotes a condition in which the urine contains ketone bodies. This condition may or may not be associated with a state of acidosis. It is difficult to explain the child's convulsions on this basis, as ketone bodies in the urine do not necessarily prove acidosis, and convulsions are not a symptom of acidosis except in nephrotic acidosis. Actually, clinically the symptoms of tetany can be abolished by acid salts or other factors that correct the acid base deficit without altering the level of the serum calcium or phosphorus. The fact that the child recovered on parental Ringer's solution again does not mean that an acidosis was present, because, if water and sodium chloride are supplied in adequate amounts, the kidney will in most instances regulate the retention of electrolytes and restore equilibrium to normal whether the disturbance is acidosis or alkalosis.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically so stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

## SILICOSIS AND ASTHMA

TO THE EDITOR:—*In a person with asthmatic bronchitis, would exposure to silica be harmful over a period of years even if nodulation or secondary infection did not occur?*

*Martin W. Davis, M.D., St. Louis.*

ANSWER.—In the person with silicosis paroxysmal asthma may appear as among any other persons, but etiologically there is no known relationship. Foremost in disabling silicosis, emphysema stands out as the cause. Emphysema alone with its shortness of breath may lead to a condition simulating asthma (not the true paroxysmal type) and may arise among those suffering from emphysema from whatever cause and has no specific association with silicosis. While silicosis will not induce any characteristic bronchitis, in a silicotic patient with emphysema, a coexisting bronchitis from whatever cause may exaggerate the emphysema and thus further the total disturbances. On an organic basis, exposure to silica will not be more harmful to an asthmatic person than to any other worker. However, over a period of years, it is undesirable for any worker, including the asthmatic person. On a psychogenic basis, the asthmatic person is prone to react unfavorably to any dust and therefore on an emotional basis may not get along well in the presence of silica dust. The correspondent might care to examine any or all of the series of Saranac symposiums on silicosis, which discusses many of the points raised. The following is quoted from the "Third Symposium on Silicosis: An Official Transcript of the Silicosis Symposium Held in Connection with the Trudeau School of Tuberculosis at Saranac Lake, N. Y., June 21 to 25, 1937" (Kuechler, editor, Wausau, Wis., Employers Mutual Liability Insurance Company, 1937): "Shortness of breath in silicotics is characteristically associated with unusual muscular effort. It does not occur spasmodically and does not resemble true asthma. However the silicotic may also suffer from asthma. When this is the case the cause of the asthma should be searched for independently, for no evidence exists that the two conditions are ever related."

## ERYTHROBLASTOSIS

TO THE EDITOR:—*Twelve years ago a woman had her first child, and this pregnancy was normal in every way. Eleven years ago she had an early spontaneous abortion. Ten years ago she had another full-term pregnancy, but this child died, cause unknown. Five years ago she learned she was Rh negative and that her husband was Rh positive; a full-term boy born at this time lived only two days. Three years ago she tried to have another child but delivered a stillborn boy in the eighth month. She was then told that it was unlikely that she would be able to have a living child. An Rh antibody titer made late in 1953 was reported as 1:2 and 1:8. What, if anything, can I offer this patient?*

*Bernice A. Torin, M.D., St. Louis.*

ANSWER.—The clinical history is strongly suggestive of erythroblastosis, namely, first a normal baby, then a spontaneous abortion, then a baby who died, cause unknown, then a neonatal death, and finally an eighth month stillbirth. However, an Rh antibody titer of only 2 to 8 units is very low and does not correspond with the clinical story suggesting three severely affected erythroblastotic babies in succession, so that only the first baby survived out of a series of five pregnancies. One would be inclined to feel that either the babies who died were not erythroblastotic, or that the antibody titers reported were incorrect. The blood of the husband, wife, and living child should be submitted to one of the central blood-grouping laboratories

specializing in this type of work. From the results of the Rh-Hr typings on these three persons and the antibody test on the mother's serum, one may be able to offer a more definite diagnosis and prognosis.

## FISTULA IN ANO

To the Editor:—*A 62-year-old farmer 18 months ago complained of soreness around the anus and of the left side of the perianal region being somewhat larger than the right side all of his life. He had a marble-sized cyst just to the left of the anus, filled with a clear gelatinous substance. This was excised. The cyst extended into the superficial sphincter. Four months later he returned with a fistula in ano at the site of the excision. The internal opening was at the 8 o'clock position on the left and was just barely inside the superficial sphincter; the external opening was at the 10 o'clock position on the left. A fistulotomy was done, and margins of the fistulous tract, when examined, showed only chronic inflammatory reaction, nonspecific. While the fistulous tract and the external opening have healed, a small anal ulcer has persisted. Now, 13 months after the fistulotomy, the findings are those of a firm induration, seemingly encapsulated, about half the size of a little finger, extending halfway around the anus on the left and stopping at the midline posteriorly and the midline anteriorly. This lies just outside the anal orifice. The induration does not extend upward into the rectum. With pressure on the induration a gelatinous mucus may be expressed from the small anal ulcer. There is the healed dimple from the old external opening of the fistula at the 10 o'clock position. A probe does not go into the anal ulcer. There is no evidence of inflammation in the surrounding tissues. The area is moderately tender. He states that the swelling is smaller at times. These times seem to be preceded by a discharge of mucus; there is no bleeding.* *M.D., Kentucky.*

Answer.—The complete and permanent extirpation of this fistulous tract can only be accomplished by: (1) fistulotomy that would include the entire tract with all its ramifications; (2) eradication of the internal opening, which from the above description would appear to be located at the site of the anal ulcer (8 o'clock position on the left), this notwithstanding failure to pass probe; (3) careful and complete excision of all infected granulation tissue lining the tract; (4) saucerization of wound edges to promote drainage and prevent bridging; (5) avoidance of the common error of repeatedly packing and repacking the wound; and (6) meticulous after-care and observation to the end that the wounds heal solidly from the bottom upward. Vitamin C in doses of 100 mg. three times a day has proved to be a worthy adjunct in promoting healing. This consultant has used chlorophyll ointment in slow healing, perianal wounds with considerable success.

## VASOPRESSIN THERAPY DURING PREGNANCY

To the Editor:—*A 38-year-old woman, para 4 and gravida 6, with two abortions at about two months, is two months pregnant at this time. There has been known diabetes insipidus since 13 years but no flare-up with previous pregnancies. With this pregnancy, urinary frequency occurring as often as each half hour interferes with the patient's rest. The specific gravity is about 1.002. The patient has an almost unbearable thirst. Are the extracts of the posterior pituitary that are listed as substantially free from oxytocic principles safe and helpful to this patient?*

*R. E. Atkinson, M.D., Crestline, Calif.*

Answer.—Pregnancy is no contraindication to carefully managed vasopressin (Pitressin) therapy. This hormone may be administered in one of three forms: powder to be snuffed intranasally, aqueous solution, and vasopressin tannate in oil for intramuscular injection. The last preparation has an effective period of action of 12 to 72 hours, while the first two named exert an antidiuretic effect for 4 to 6 hours. These compounds are readily available, relatively inexpensive, and are sufficiently purified so that any oxytocic effect is insignificant. If the diagnosis is accurate, specific dramatic amelioration of this patient's symptoms should be promptly effected by their use.

## DUODENAL ULCER

To the Editor:—*A 65-year-old man has had a history of ulcer symptoms for about one year, terminating in acute perforation of duodenal ulcer. This was repaired surgically within a few hours. His postoperative course was uneventful, and after four months he is almost completely asymptomatic. However, he is still on a diet and therapy regimen for ulcers. X-ray studies revealed a deformity that the roentgenologist believed to be secondary to closure of the perforation. Should this man be subjected to gastrectomy?*

*M.D., New Jersey.*

Answer.—The majority of patients who have had a perforated duodenal ulcer with surgical repair subsequently have further ulcer symptoms of varying degrees of severity. Many, however, remain symptom free thereafter. A gastrectomy is not indicated in this patient at the present time. There is a good possibility that medical management will be successful, since a hypersecretion of gastric juice of marked degree is not usually found in patients of this age. A good estimate of the problem can be obtained by measurements of the fasting nocturnal gastric secretion. If the 12-hour output of free hydrochloric acid under these conditions is 50 mEq. or less, the probabilities are that medical management will be successful. If, on the other hand, the output exceeds 100 mEq. the probability is great that further surgical treatment will be required.

## PAIN IN ATROPHIED CALF MUSCLES

To the Editor:—*A 21-year-old man had poliomyelitis at the age of 7. Since then he has had a mild atrophy of the calf muscles of one leg and for several years has complained of pain in that leg on walking or sitting long in one position. There is no limp, no abnormal sweating or color change of either extremity. Dorsalis pedis pulsations are normal. He is a thin person without heavy musculature. Reflexes are normal. What are the causes of this pain, which is occasionally relieved by massage? Strong massage or deep pressure elicits areas of tenderness within the muscles. What tests do you advise in arriving at a diagnosis and what is the prognosis?*

*M.D., New York.*

Answer.—The history and symptoms suggest that at present this young man is suffering from muscle strain of the lower extremity. Strapping of the foot to give support of the arch would act as a test. If he obtains relief, muscle strain is the probability. Periodic resting, which means short periods of rest, 20 minutes four times daily, would give relief. After the symptoms subside, a course of graduated exercises should be carried out to increase the strength of the muscle and thus prevent recurrence of the symptoms. The pain is due to muscle strain. Massage relieves it by improving circulation to the muscles. The therapeutic tests described above will establish the diagnosis. Prognosis is good.

## TRACTION TO LUMBOSACRAL SPINE

To the Editor:—*Is there any method for the application of traction to the spine other than the overhead cervical traction with halter or other device, or the traction on the legs with Buck's extension apparatus? What I have in mind is some method to apply traction to the lumbosacral spine more efficiently than by Buck's extension apparatus to the legs.*

*M.D., California.*

Answer.—In lieu of Buck's extension, traction may be applied to the lumbosacral spine by means of a pelvic sling. The sling is basically a soft, low back corset with strips of webbing attached to each side. These strips are then applied to a spreader bar just distal to the patient's feet, and a single rope with the desired weight is then applied to the spreader bar. Rather large amounts of weight can be put on this sling, provided the iliac crests are padded with felt. It is desirable to tilt the foot of the bed so that the traction will not be fouled by contact between the spreader bar and the pulley.